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MACWORLD

The Macintosh® Magazine

May 1991 $3.95 Canada $4.95



Better Than Hard Drives?

Removable Cartridges

See page 124

WHICH ONE SHOULD YOU BUY?

12 Low-Cost Laser Printers

FONTS

A Guide to Their Use

SECRETS OF COLOR TYPE

All about Trapping

MW LAB TEST

38 B&W and Gray Scale Monitors

#440H**********3-DIGIT 570 0C
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The largest word history got there



processor in Mac by thinking small.



When we introduced Microsoft® Word six years ago, we weren't planning on making history.

We had just one goal, and a fairly simple one at that: to make a word processor that suited people's needs.

Then again, we knew that the people we wanted to suit were a wildly diverse, independent lot: Mac® users. So it made sense to let them tell us exactly what to put into Word.

Which they did.

First, there were some folks who didn't like tabbing much. Fair enough. For them, we developed Tables—an easier way to set up side-by-side paragraphs, columns of numbers, even forms. No tabs. No hassle.

Then we heard from a few more people. "Love the Tables gig," they said. "Now, about this text-numbers-graphics combo all in one document..."

We made that simple with "warm links." Once you've linked Microsoft Excel data to a document, keeping that document updated with the latest Microsoft Excel figures is easy. Just click your mouse.

Then there were those senders of mail, who didn't want to click-click-click-click-click-click.

So we built support for Microsoft Mail right into Word. Now, with just a click, everyone stays in the loop. And work in progress *stays* in progress.

As it happens, listening to what Mac users want is a pretty good way to design software.

How else can we explain Word version 4.0 being the most popular word processor in Mac history?

And those cards and letters are still coming. "Listen," someone'll say. "In case you're working on the next Word..."

Which we are. In fact, if you've got some input for us, feel free to drop us a line. Or if you'd like to find out more about Word, call us at (800) 541-1261, Department N24.

Our goal is still simple: to make Word the best word processor around. With the latest technology—translated into human terms, of course.

After all, we're only making history because we make word processors the way you like 'em.

Microsoft®

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Send those cards and letters to: Microsoft Word for Macintosh Development Team, One Microsoft Way, Redmond, Washington 98052-6399. Customers in Canada, call (416) 673-7638. Outside North America, call (206) 936-8661. *© 1990 Microsoft Corporation. All rights reserved. Microsoft and the Microsoft logo are registered trademarks and* Making it all make sense *is a trademark of Microsoft Corporation. Mac is a registered trademark of Apple Computer, Inc.*

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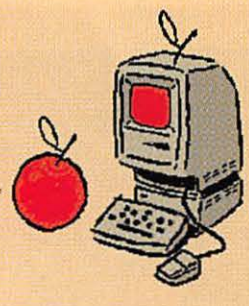
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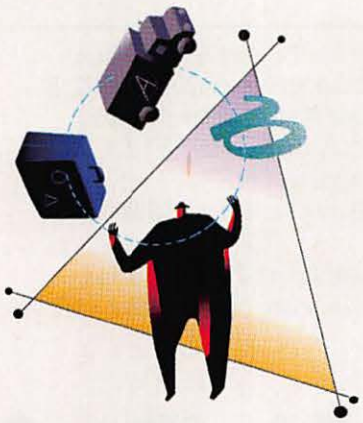
By Erfert Fenton Suffering from fear of fonts? Conquer your phobia with four step-by-step scenarios for installing and managing a font collection.

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By Steve Roth White space is a designer's dream, but not when it turns up between two adjacent colors. Here are some color-trapping techniques that compensate for printing registration problems.



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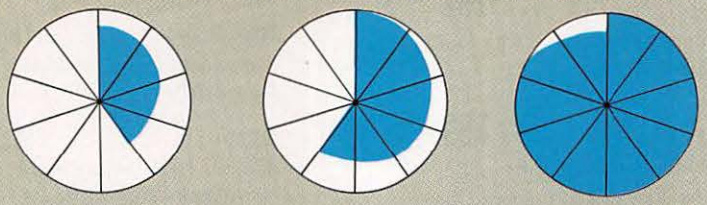


All video display terminals (VDTs) emit electromagnetic radiation (EMR) through the screen. The photo on the left is a visualization of EMR in red from the screen. The photo on the right shows that the NoRad Shield™ virtually eliminates screen-emitted E-Field EMR and better than half of magnetic EMR.*

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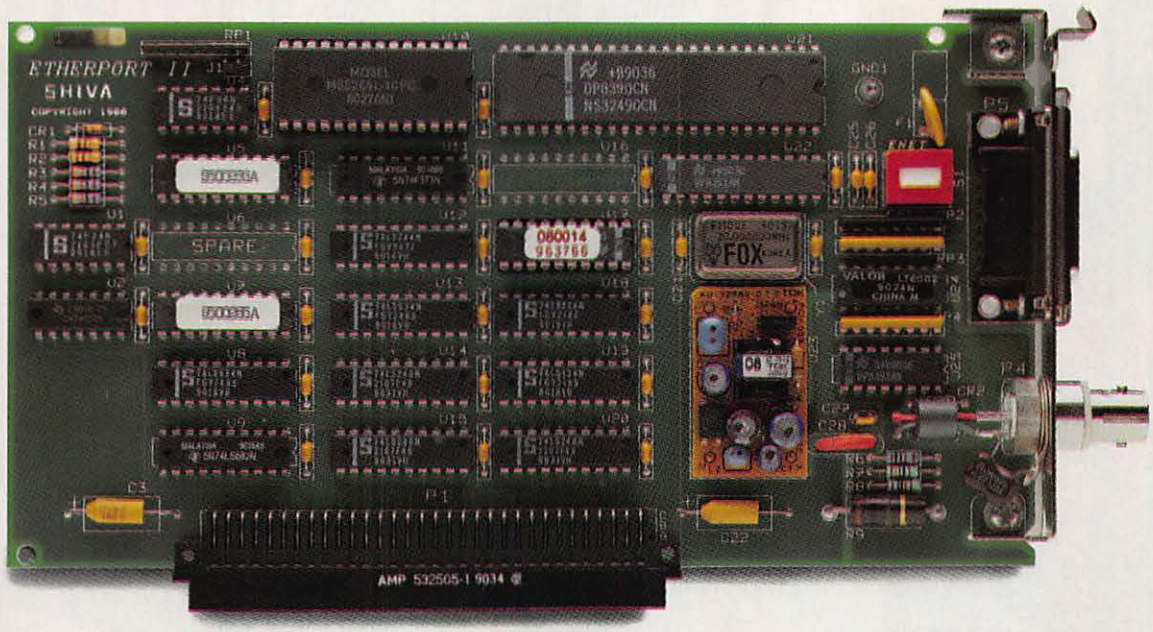
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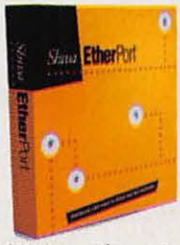
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EtherPort cards are available for a variety of Macintosh models.

The day we introduced our newest product, a lot of people already owned it. Because EtherPort,® the leading Macintosh Ethernet card sold by Novell, is now a Shiva product.

As the leader in AppleTalk internetworking products, Shiva has been exclusively chosen to support and evolve the EtherPort product line. Which is why EtherPort now comes with new, high-performance drivers. Along with support for 10BaseT. And coming support for Apple's Ethernet cable system. All for $100 off Novell's original price.



Shiva is now the company to contact for all EtherPort support.

If you're already using EtherPort, all you have to do is call Shiva at 800-458-3550, or 617-252-6300, for your free driver upgrade. And if you're looking to purchase an Ethernet card, call the same numbers to find out which card is best for your Mac. You'll find it's easy to connect with Shiva.



Etherport cards can also support 10BaseT.

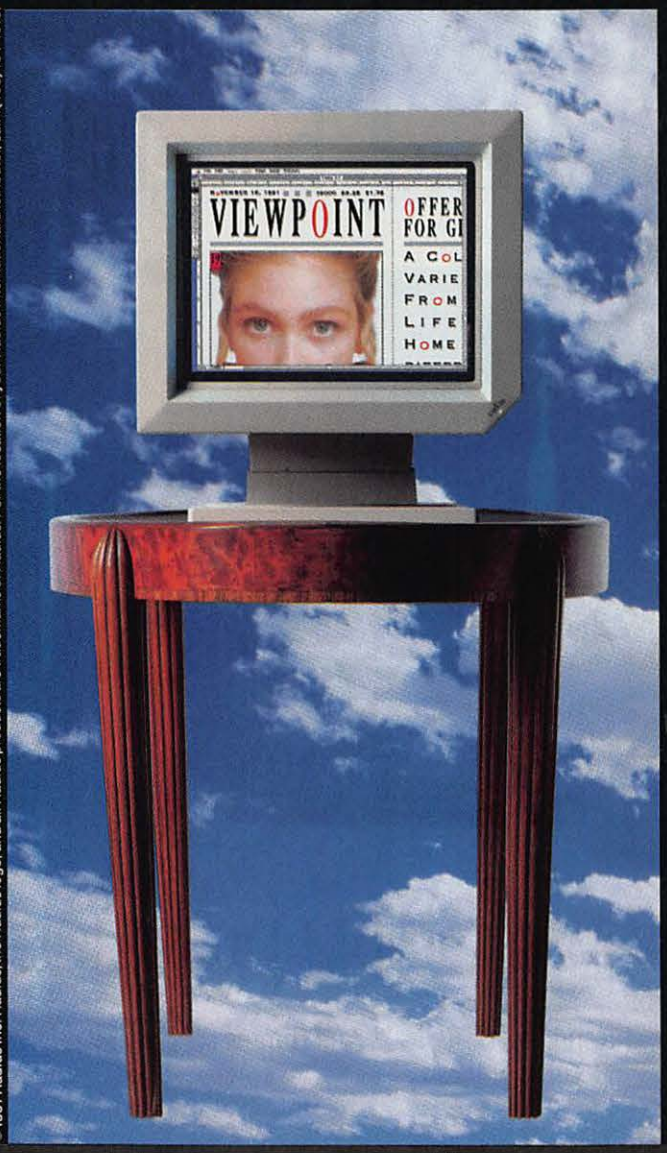
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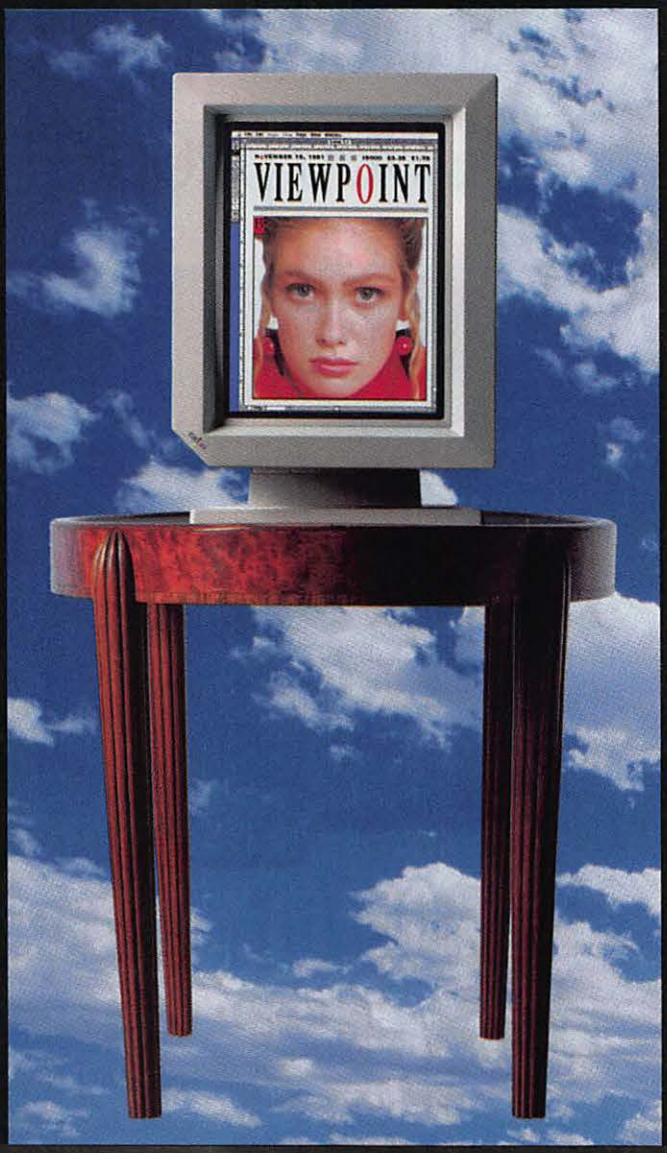
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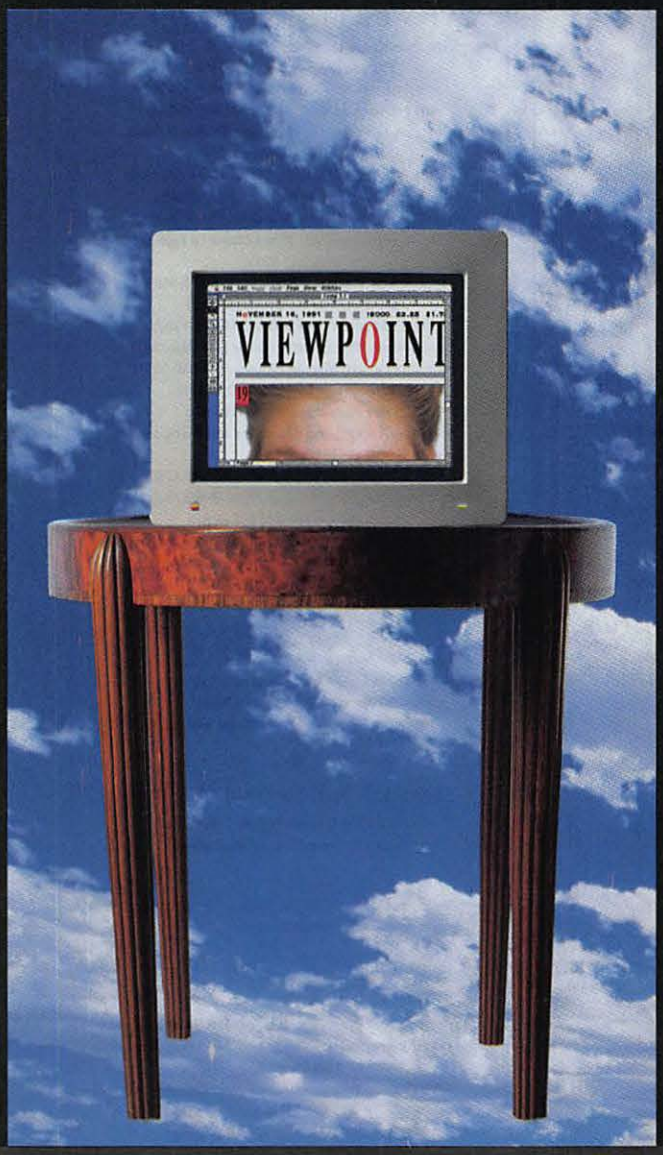
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The New Color Pivot Shown In Landscape And Full-Page Mode.

The comparison you see above is really no comparison at all. ● If you live in a world where things are all middle with no top or bottom, or where the year has only six months, you might choose the Apple.® But if you would like to see a full page of color graphics, and see twelve months of spreadsheet instead of merely six, and be able to go from portrait to landscape with swift and deft ease, *and* own the only color full-page display on the



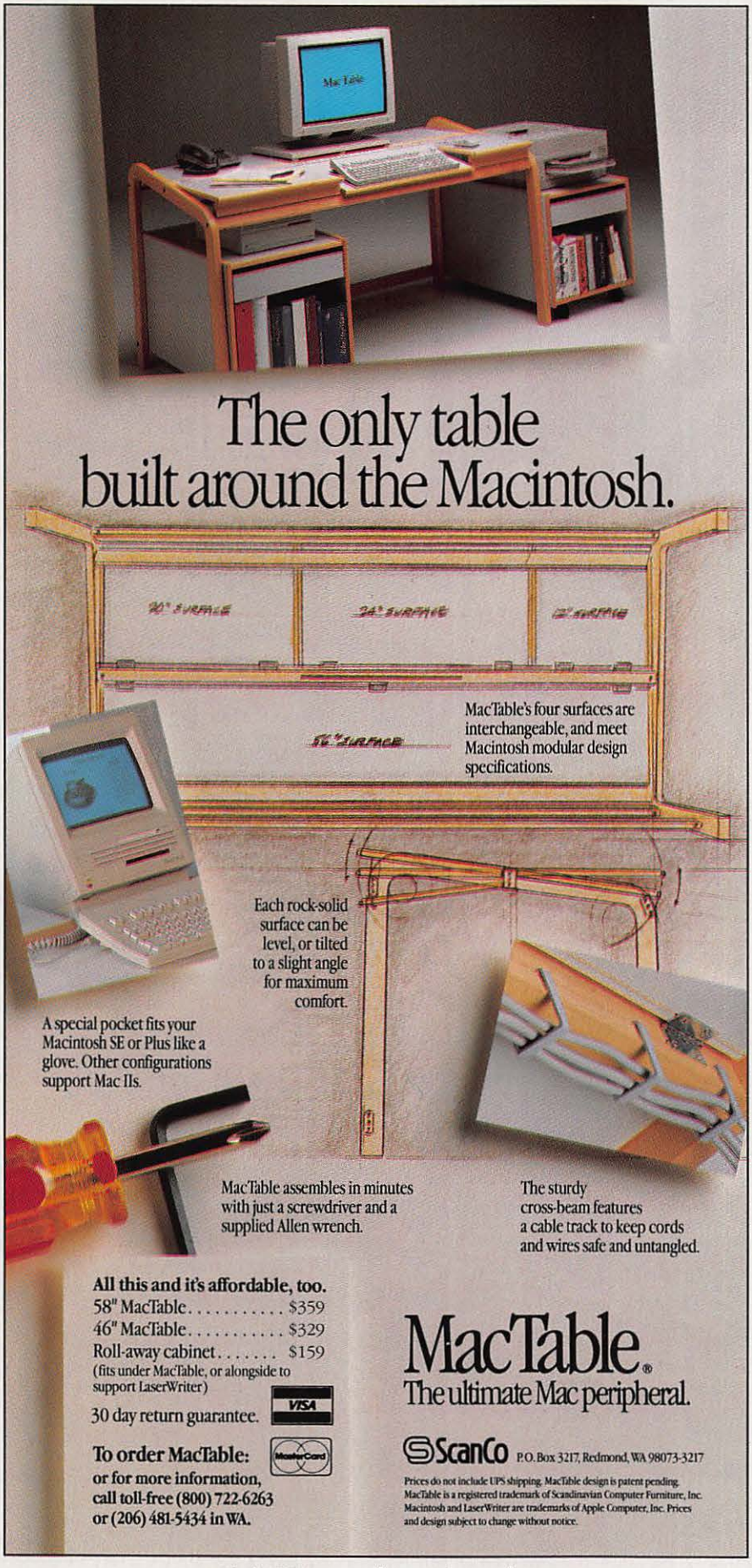


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The Apple 13" Shown In Landscape And...Uh...Paperweight Mode.

market, you will probably choose the Color Pivot.™ Okay, you will definitely choose the Color Pivot. ● The Color Pivot is compatible with all color capable Macs. And on the Mac IIsi and IIci with built-in video, the Color Pivot needs no interface. But when all is said and done, perhaps the best thing about the Color Pivot is that, well, it's a Pivot. ● For more information, or the location of your nearest Radius reseller, call 1 (800) 227·2795.

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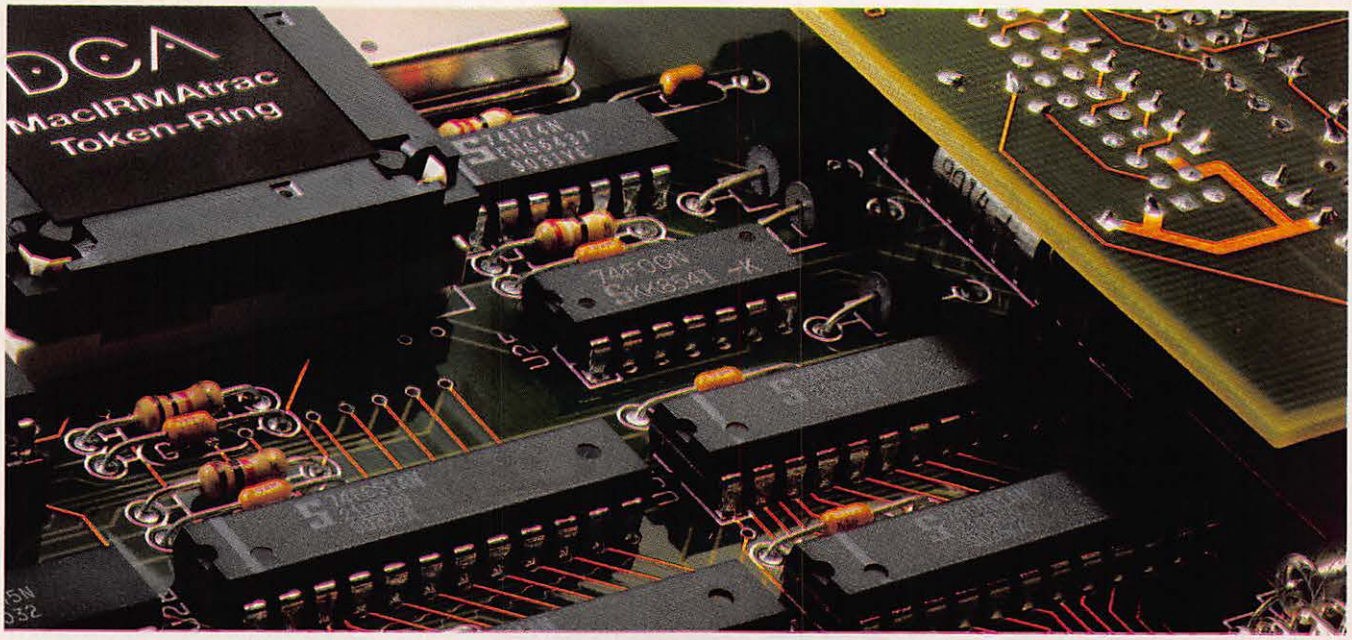
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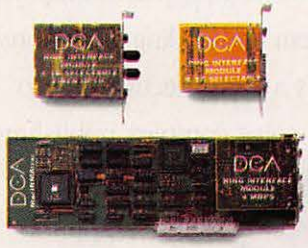
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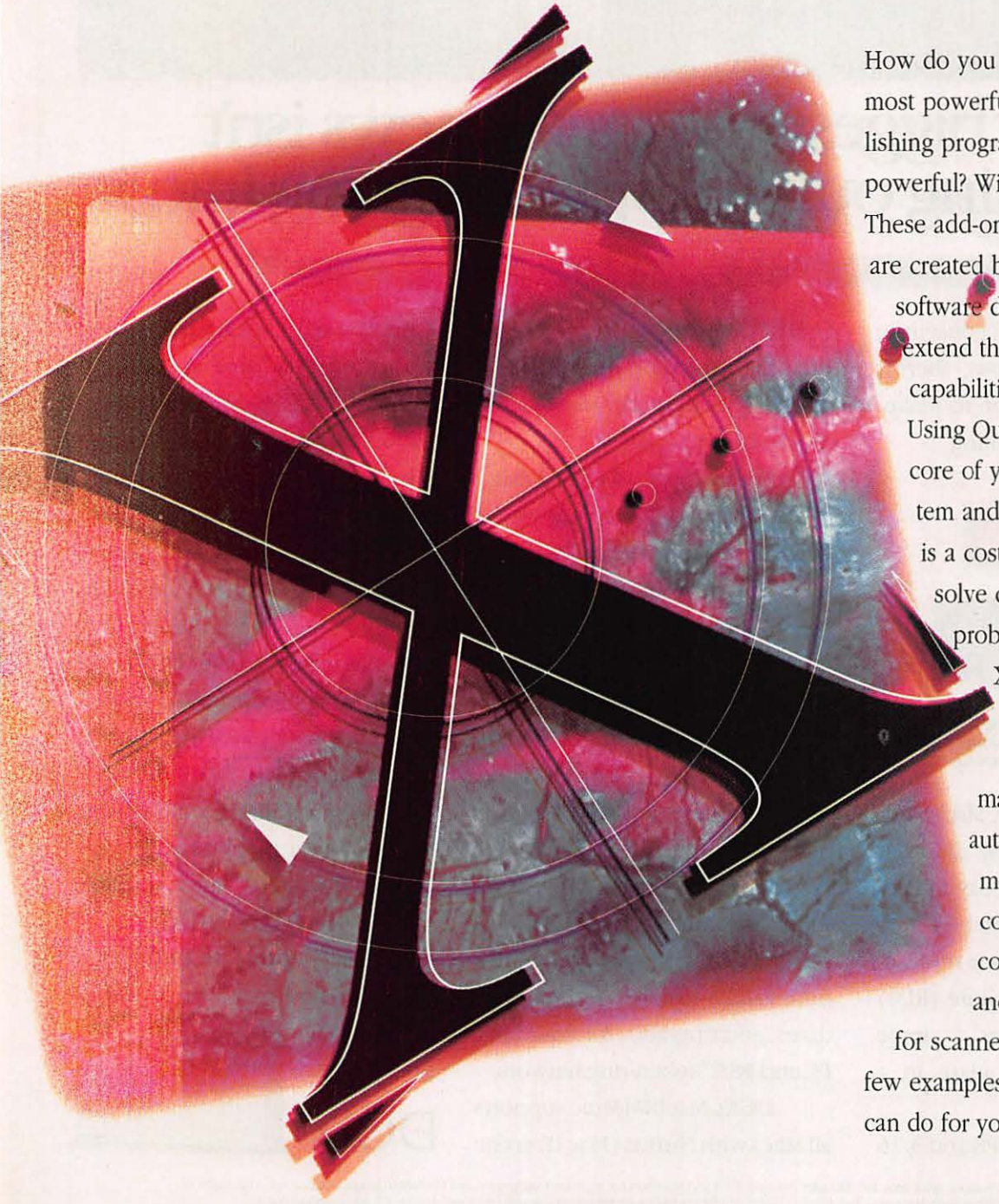
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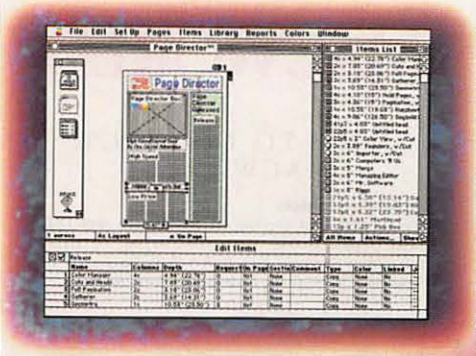
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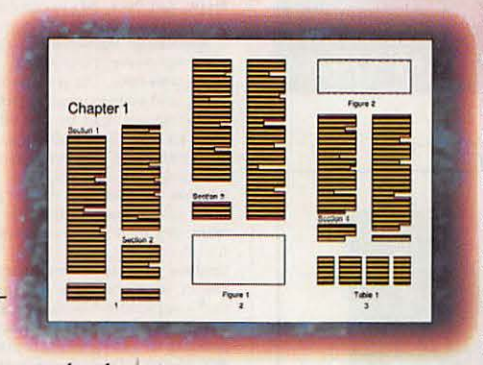


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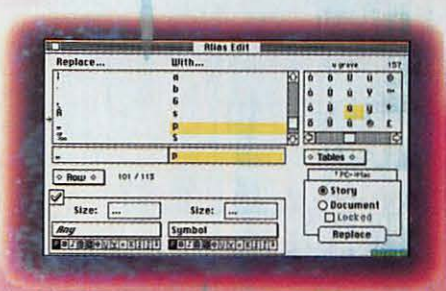
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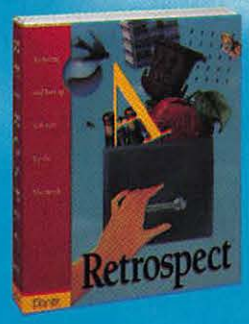
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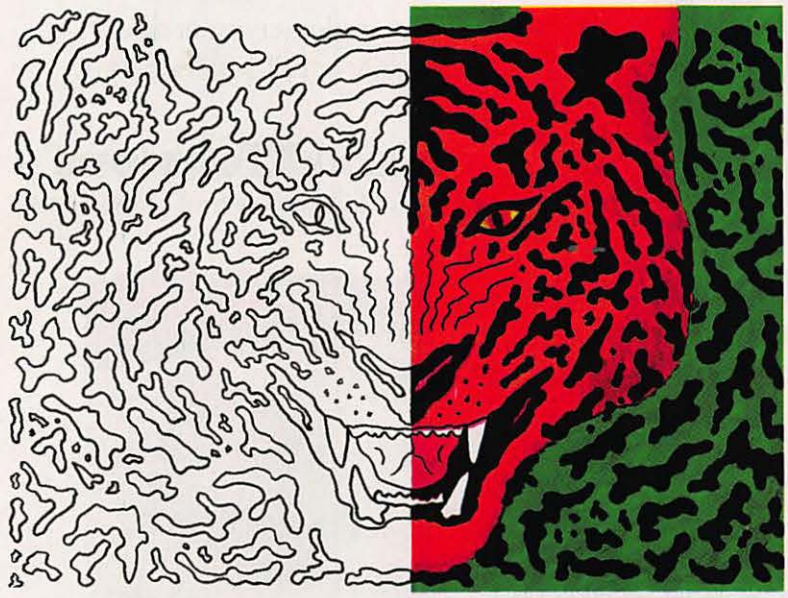


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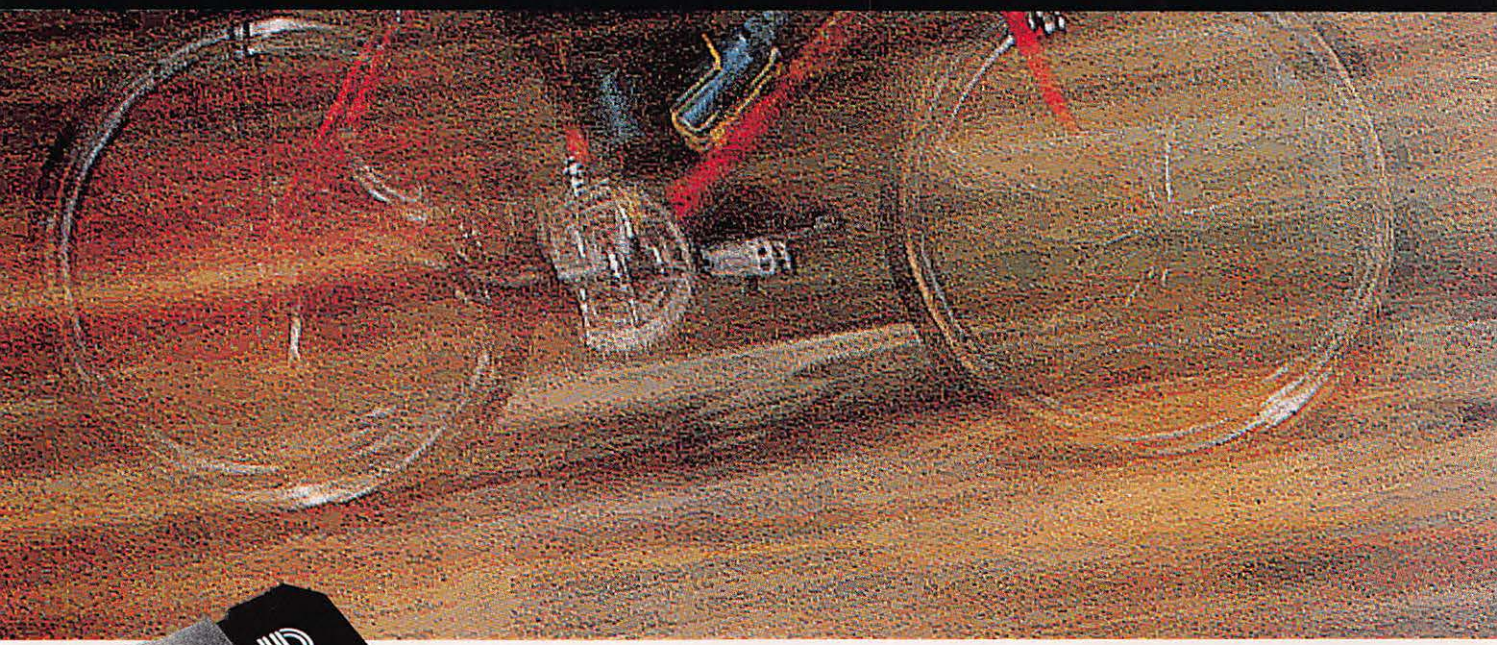
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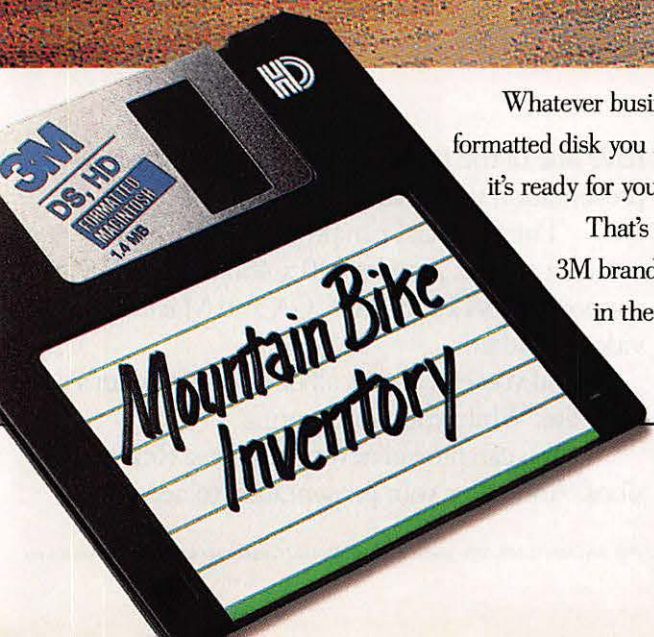
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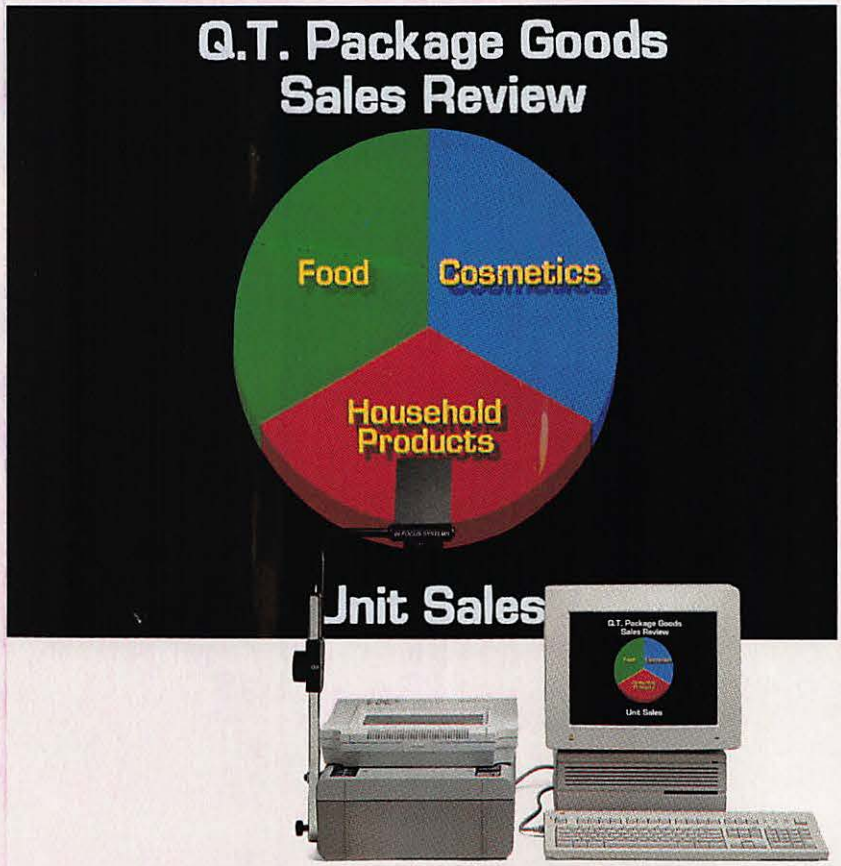
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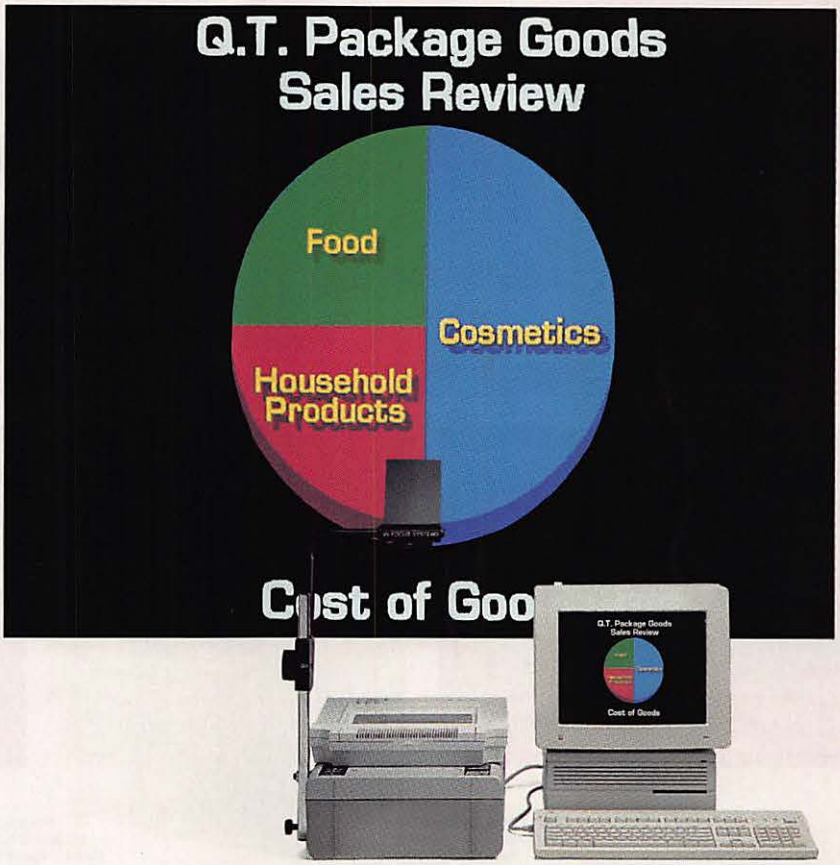
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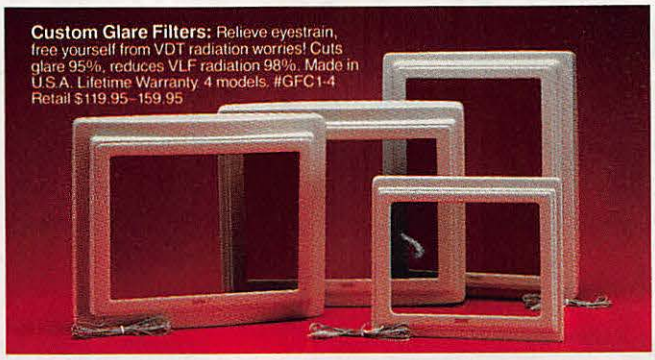
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MacBulletin

Apple Interface Suit Heads for Trial

A federal district court judge's ruling that the Macintosh interface is original to Apple has cleared the way for Apple's copyright-infringement suit against Microsoft and Hewlett-Packard to go to trial. The San Francisco judge also held that a 1985 agreement between Apple and Microsoft does not give Microsoft an effective license to use significant parts of the interface—overlapping windows and icons—which appear in Microsoft Windows 2.03 and in Hewlett-Packard's NewWave.

DTP's Bad Old Days?

A federal judge in Denver has granted Quark's request for an injunction to block Scitex from selling Visionary. Negotiations to renew Scitex's license for Visionary, a version of QuarkXPress that can export in Scitex's proprietary format, broke down largely over Quark's desire to produce a product that could read as well as write Scitex files. At press time, Scitex, its customers, and its resellers were prohibited from marketing Visionary, though Visionary owners could continue to use the product.

Meanwhile, Back at the Ranch . . .

Quark has not let the lawyers bog down its engineers. Version 3.1 of QuarkXPress adds many features, including some for high-end users. You can set choke and spread specifications for individual elements. A Colors palette supports coloring and shading frames, pictures, text, and backgrounds, and color blends. Styles are now available from an on-screen palette. You can also save kerning and tracking tables with a document. For more information, contact Quark at 303/934-2211.

The Future of Memory

Prices for 1MB SIMMs (Single Inline Memory Modules) have soared since December, when the memory chips bottomed out at less than $40. Many overseas manufacturers have cut back the production of 1MB chips in favor of 4MB chips, while demand for the 1MB SIMMs has remained steady. Prices on 4MB SIMMs are falling, and one vendor predicts the two configurations will achieve price parity during the second quarter.

NEC Introduces Color PostScript Printer

NEC Technologies has begun shipping an entry-level color PostScript printer that uses a thermal-transfer print engine and lists for $6995. Called the Colormate PS Model 40, the device includes 4MB of RAM, 17 Adobe fonts, and a 68020 microprocessor. NEC is also offering a $2000 upgrade board with another 4MB of RAM and 18 fonts. NEC will sell the upgraded printer as the Colormate PS Model 80, which will supersede the existing Colormate PS. The Model 40 handles letter-size and A4 pages, while the Model 80 can also handle legal-size paper. For more information, contact NEC at 508/264-8000.

FrameMaker's New Picture

Version 3.0 of the technical publishing software FrameMaker adds three key features: support for importing (but not editing) full-color images and exporting them for color separation; a nonmodal table-creation environment; and a new text-control system called conditional text. Conditional text lets you embed several versions of text in a document and set conditions to control displaying and printing versions—for example, a manual for software that runs on Macs and Sun workstations might contain two sets of instructions in the chapter on installation. FrameMaker's price remains $995. For more information, contact Frame Technology at 408/433-1928.

Color Pivot: A New Twist from Radius

Radius recently began shipping the Radius Color Pivot, a color version of the company's popular pivoting-screen monitor. The 15-inch Color Pivot can display 16 colors when running with the built-in graphics controller on the Mac IIci or IIsi, and 256 colors when using one of a range of Color Pivot graphics adapters from Radius. The graphics adapters, also shipping now, are designed for each of the color Macs. The adapters all list for $795, except for a 2-bit model for the LC. That model lists for $395 and can be upgraded to 8-bit for $400. The Color Pivot lists for $1995. For more information, contact Radius at 408/434-1010.

SyQuest Debuts 88MB Removable-Cartridge Drive

SyQuest has introduced an 88MB version of its popular removable-cartridge hard drive, doubling the storage available in the same size drive. The new drive can read data on existing SyQuest 44MB removable cartridges (sold by a variety of vendors)

(continues)

but cannot write to the lower-capacity cartridges. The device will be available from PLI, MicroNet, and Mass Micro, with other vendors expected to follow. The PLI drive, called the Infinity 88 Turbo, carries a $1595 list price and was slated to begin shipping in March. For more information, contact PLI at 415/657-2211.

The Expanding QuickMail

Version 2.5 of CE Software's QuickMail lets more IBM PCs and compatibles communicate across AppleTalk networks by providing client capability for PCs on any AFP-compliant network operating system, including products from Novell, 3Com, Banyan, and DEC. In addition, version 2.5 stores a single copy of messages addressed to multiple recipients, which should provide a substantial performance boost. Pricing depends on network configuration. For more information, contact CE Software at 515/224-1995.

Pushing Ahead with PostScript

With Apple's TrueType font technology about to arrive, Adobe has made two announcements to maintain the appeal of Adobe PostScript. First, the company has licensed fonts from the German foundry Berthold and plans to release them in Type 1 format; the first three fonts should be available in March. Second, Adobe is developing what it calls Multiple Master Typefaces, which can interpolate between several versions of a typeface to provide almost unlimited variation in weight, width, size, and style. Multiple Master Typefaces should be available by late 1991. No prices were set at press time. For more information, contact Adobe Systems at 415/961-4400.

Digital Font Foundry

ATF Type Designer is a new tool for creating PostScript Type 1 and Type 3 fonts as well as TrueType fonts, Microsoft Windows screen fonts, and Next fonts. It can create font families including bold and italic; import and edit Type 1 fonts; and generate bitmapped screen fonts. ATF Type Designer also provides tools for fine-tuning hinting and for generating kerning tables. It lists for $549. For more information, contact Kingsley/ATF at 602/325-5884.

Bug Report

WordPerfect 2.0 shipped in January with a number of annoying, though not fatal, bugs, including screen-refresh problems and difficulty opening Microsoft Word 4.0 files. WordPerfect released a bug-fix in early March and will send it to any registered user who requests it. For more information, contact WordPerfect Corporation at 801/222-5000.

HP, GCC Cut Printer Prices

Hewlett-Packard has cut the U.S. list price of the Mac version of the popular 4-ppm LaserJet IIP by $400 to $2195. That configuration includes AppleTalk, PostScript, and 1.5MB of RAM. The price drop was motivated by competitive pressures, according to an HP representative. At the same time, GCC lowered the list price of its PLP II QuickDraw printer to $999, and its PostScript-based BLP II to $1999 from $2399. The company said it was reacting to "expected developments." The announcements came shortly after Apple began briefing analysts and press on its new low-cost printers (see *Macworld News,* in this issue).

Project Management Goes Mod

AEC Software is redefining project-management software with task-specific modules, instead of taking the omnibus approach of most vendors. AEC's new FastTrack Resource is a $235 package for allocating workers, equipment, and facilities. FastTrack Resource provides a sophisticated set of sorting filters and load histograms to simplify allocating and leveling resources. Its lack of task precedence and critical-path scheduling makes the package best suited for subproject managers who lack discretionary control over scheduling. AEC is also developing FilePower, a full-featured relational database with an object-oriented programming environment. For more information, contact AEC Software at 703/450-1980.

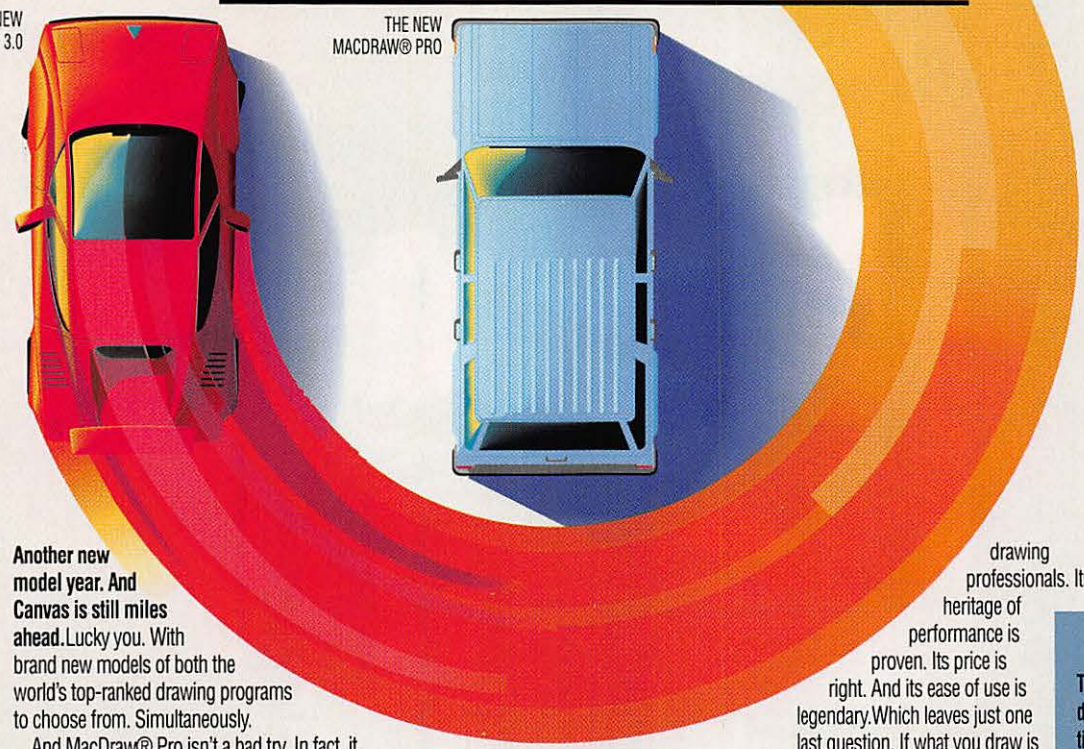
The New Theme

GeoVista is a new, easy-to-use thematic mapper for generating quick maps to elucidate simple data sets. GeoVista can only overlay three variables per map, can show only one at a time, and can't perform the relational comparisons of high-end geographical data–analysis systems. It can categorize data based on standard deviation, equal groups, or quantiles, and can save completed maps as either paint files or 32-bit color PICT files. It comes with boundary files for the United States and county boundaries for each state. GeoVista lists for $249. For more information, contact Newton Software at 617/239-8202.

On the Wire

The AG Group is following up its EtherPeek packet analyzer for Ethernet with LocalPeek, for monitoring and troubleshooting traffic on LocalTalk networks. LocalPeek provides a separate report for each transaction by protocol level and has tools for statistical analysis. It lists for $495. The AG Group is at 415/937-7900. Proteus Technology is preparing version 2.0 of Quota, a utility to help network administrators comply with software license agreements by controlling how many copies of an application are in use. Version 2.0 runs under MultiFinder, compiles more detailed records, and can track applications installed locally as well as on a server. It lists for $695 for 50 network users. Proteus is at 403/426-6794. ■

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MacDraw Pro doesn't.

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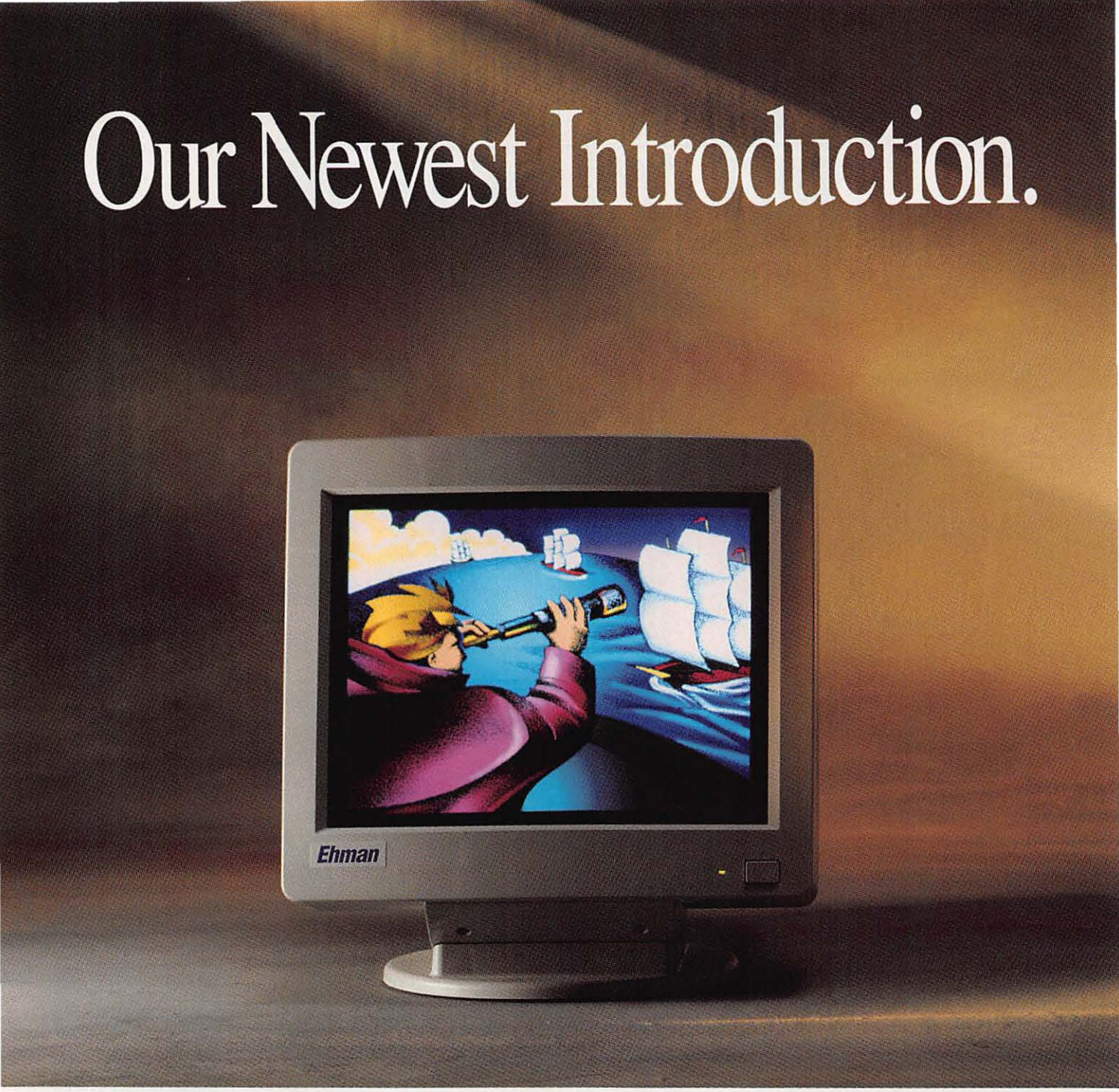
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Color monitor illustration by Rob Mageira.

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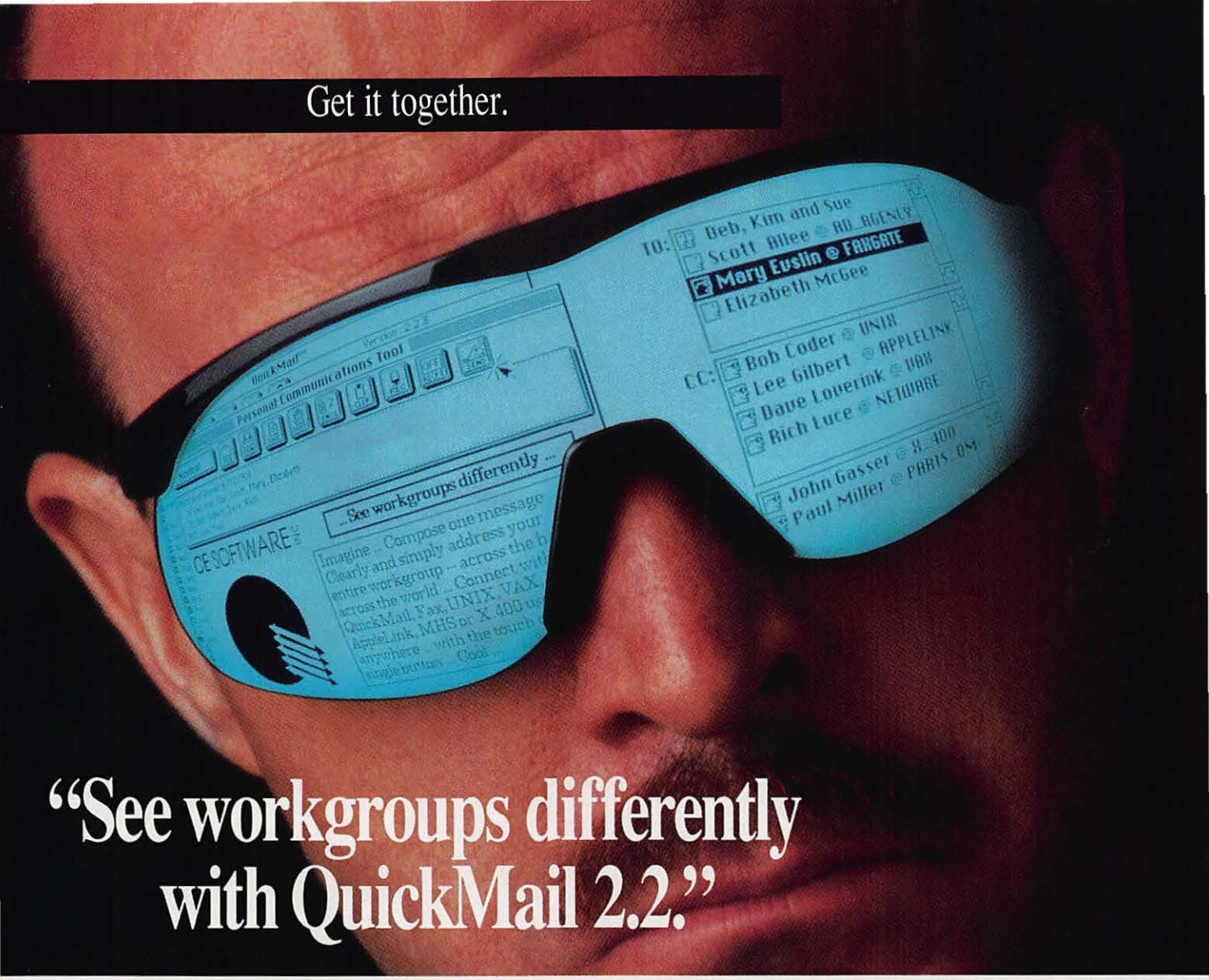
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Laptop on My Mind

WHY WE'RE STILL WAITING ON APPLE

BY JERRY BORRELL

Two years ago, or so the story goes, a representative from Sony Corporation in Japan approached an Apple Computer executive with an extraordinary offer. He proffered to the Apple exec the specifications for a portable computer small enough to be held in the palm of the hand. The device was based upon the Motorola 68000 processor and had a small, flat, LCD display; a QWERTY keyboard; a 125MB, 3½-inch optical drive; function keys; and a unique cursor-control device, which I'll call a virtual mouse, that allowed easy cursor control. The portable computer could be connected to large monitors. And because it was Sony, while the company was at it, the engineers thought to add a stereo headphone port so that the user could even listen to music or sound from the machine. The Sony representative offered to allow Apple the exclusive rights to market the computer if only Apple would in turn agree to provide the Macintosh Operating System for the machine.

The Apple exec, the story continues, proceeded to tell his Japanese colleague where he could put this machine. Because Apple was going to build a portable computer even more sexy. Indeed, Apple even portrayed such a computer in an internal promotion film, one of a series of such films made in the now-passé heyday of Apple's peregrine enthusiasm for Knowledge Navigator.



Sony sells its Data Discman only in Japan because Apple refused an earlier offer from Sony to port the Mac OS to the product.

Today, as we all know, there is no such product offering from Apple, while Sony is busy selling its Data Discman in Japan. At first glance the Data Discman might be discounted as a mere replacement for all those Casio or Sharp electronic executive diaries—one of those miserably configured little devices so loved by the technically addicted, who are willing to store their diaries and phone numbers in them. On investigation, the Data Discman shows more potential. One example is its library of electronic books, which includes dictionaries, statistical references, medical references, and novels. An optical drive with 125MB allows a lot of material to be stored. Currently the Data Discman has word processing software, plus software that lets you download your address book to the Data Discman. It's this type of utility software that demonstrates what the Data Discman might have been if Apple had graced the little device with the Mac OS. I won't argue that you would want to type a memo on the device, but with 125MB of storage you could carry around your entire history of business correspondence for reference.

And if thinking about Mac users losing access to the Data Discman isn't enough to burn your grits, then you need to imagine yourself standing in the middle of an electronics store in downtown Tokyo. On making my annual hegira to Tokyo's electronics district I stood pondering the poor value of the dollar in Japan (the Data Discman costs the equivalent of $520) and cursing Apple's decision not to make one of these little gadgets available.

(continues)

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Apple's prototype hand-held computer, as portrayed in one of the company's internal promotional films.

Wait, There's More

Unfortunately it gets worse. Sitting not far away from the Data Discman, in the same store, was a Sony flat-panel, color LCD television. I have to admit that I had given up on color flat-panel displays because of such major drawbacks as poor contrast, dimness, awful reception, artifacts resulting from pixel dropout, and sheer weight. Then I saw Sony's latest flat-panel color LCD television, which was bright, thin, and had great picture quality and fantastic broadcast television reception. Really good.

I envisioned some capable engineer providing that kind of a color display for a version of the Data Discman, which would have made it possible for me to view all my color files from the Macintosh. I started to walk out of the store in disappointment—barely slowing down while walking past the fantastically expensive DAT recording technology—when I looked down and noted a Sony DATman. It looked rather smaller than the first transistor radio I had as a boy. It cost nearly $600 so I was not even slightly inclined to buy it, but I did pause to listen to the CD-quality sound throbbing out of the tiny earphones attached to the device. I picked up one of the DAT tapes and, with a start, I realized that it was the same technology and format tape (8mm) that some vendors now sell as backup for the Macintosh. Each small tape holds up to 2 gigabytes of data.

I shrugged derisively as I passed the counter that held the Panasonic Dynabook laptop computer, wonder-

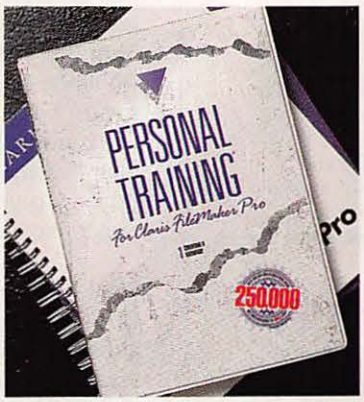
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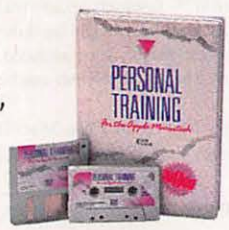
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List price **$39.95** plus shipping. Please specify **Mac, Mac Plus, Mac SE, or Mac II.** Quantity pricing also available. Money back if returned in 30 days. Purchase orders accepted. Send for catalog.

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ing at the marketing chutzpah that allowed the company to adopt that famous name for use with a DOS-based computer. That coincidence of impressions made me think of laptop computers and of John Sculley's remarks in February, at the first Japanese Macworld Expo, to the effect that Sony would be working with Apple on new product announcements. It was juxtaposed in my mind with Michael Spindler's statements that Apple would be licensing its operating system to other manufacturers. It made me wonder what Apple's laptop would look like and whether it would be a product to amaze or one to confound, rather like the last portable.

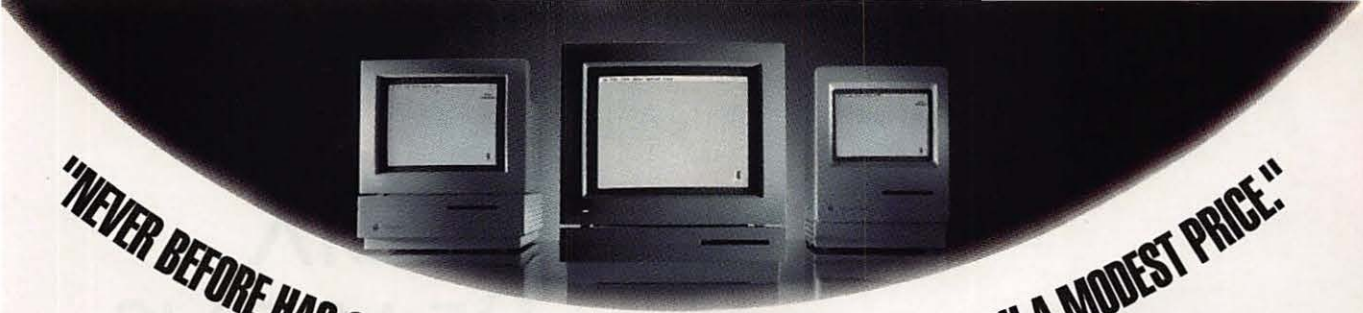
Stop! Don't Go!

One more pen-based computer disguised as a portable and I'll scream. Portable they are. Useful for many vertical applications they are. Portable computers, as Yoda would say, they are not.

I remember my first portable, an Epson laptop announced in 1982. It had a full keyboard (it's remarkable how millions of users can navigate most computers with only cursor-control keys), ran on D-cell batteries, and had a 5-line LCD display and a tiny, frustrating, built-in printer. I quickly tired of taking notes with a computer that produced output similar to a grocery store tape—but that device, much improved upon by Toshiba in today's laptops, was once my ideal. A notebook-size computer that slips into my briefcase.

But after seeing the Data Discman and other existing consumer products, I'd like a notebook computer to have a color display, a 125MB optical drive, and one of those incredible virtual mice. A built-in 8mm tape drive for backup would be nice for some people, but that should be optional. The computer should drive my Apple 13-inch RGB monitor when connected to an AC power source. And the connection ports should remain standard. Please, no finger pointing for cursor control, no pen interaction, no little touchpad interaction—just a solid keyboard and a mouse device.

After all, if you're going to sell Apple's soul to . . . Sony, you better get something out of it.



THE NEW LOW-COST MACS--FROM $999

"NEVER BEFORE HAS SO MUCH MUSCLE BEEN AVAILABLE AT SUCH A MODEST PRICE."



ULTRAPAINT--$199 LIST

DITTO.

Even before the Macintosh Classic® & its new companions came along to wow the reviewers with heroic price/performance ratios, UltraPaint was keeping them plenty busy.

"As advertised, Deneba's UltraPaint...really does set new Macintosh graphics standards", wrote Ernest Mau of CompuServe.

"...many more B&W paint features than SuperPaint, almost all of PixelPaint's color tools, a superset of MacDraw II's object-oriented features, and the gray-scale prowess of Digital Darkroom. All this comes in a single program for less than half the price...", wrote David Pogue in MacWorld.

Perhaps Chris Prior of MacUser UK summed it up best when he wrote that "UltraPaint...could prove to be the ideal software package for those looking for a powerful, all-around draw and paint program."

And it's true. UltraPaint really does offer you the same sophisticated graphics processing power of several leading programs combined — all in one inexpensive, easy-to-use package.

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2

Software with a Silverlining.

Every La Cie drive includes a FREE copy of Silverlining, the #1-rated hard drive management utilities program.

Silverlining drivers can get 30% more speed from a drive than the competition. It works with any true SCSI drive, internal or external. So one program can manage it all. Plus, Silverlining optimizes your data so it's consecutive on your drive, which makes your applications run faster.



MacUser says, "Silverlining is one of the most powerful and useful hard disk utilities you can find—most Apple engineers prefer it to Apple's own."

And, Silverlining drivers are intelligent. They test the drives' functionality at startup to ensure that everything is working properly. If it's not, it protects you.

For even more protection, every La Cie drive includes a FREE copy of Norton Utilities® for the Macintosh. It automatically diagnoses, reports and repairs common and dangerous disk problems. Silverlining and Norton Utilities are regularly priced at $149 each. So, you get software worth almost $300—ABSOLUTELY FREE— when you buy a La Cie drive!

3

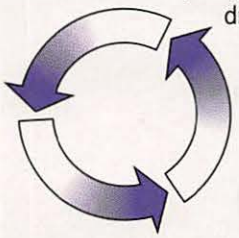
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La Cie is a Plus Development Company (makers of the Hardcard® XL), backed by $400 million in assets. That means you can trust La Cie to provide a constant source of high-quality mechanisms and components. And you can be certain that we'll be around to help you with service and support. For a long, long time.

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La Cie features a RENEWABLE 2-YEAR LIMITED WARRANTY.† If anything goes wrong with your La Cie Quantum drive within two years, we'll repair or replace it within 48 hours—and then renew your warranty for another 2 years. Free of charge!



Every La Cie drive is backed by toll-free support from customer service and technical assistance experts.

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5

Award-Winning Design.

Hard drives that win design awards? Who says intelligence has to be ugly? The Tsunami and Cirrus hard drives have received prestigious awards from both the industrial design and computer communities.

La Cie drives are designed from the inside out. Designed to be quiet (with a ½ speed fan), lightweight (as light as 2½ lbs.), durable and reliable. Plus, they have an external termination and SCSI address switch, which means you'll never have to open the case for any reason! You don't win awards for these features, but you do win a loyal following.

6

Rave Reviews from Critics and Customers.

Frankly, there's been a lot of talk about La Cie hard drives.

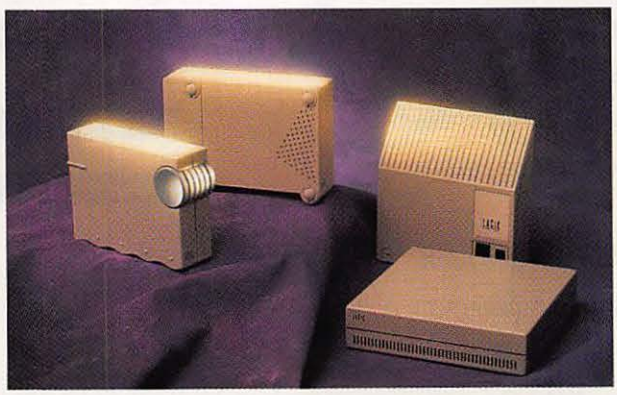
Leading Macintosh consumer magazines praise us. Customers write us fan letters. In fact, we're happy to let critics and customers have the last word about La Cie drives. Because they tend to be words like these:

★★★★★ —MacUser

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"Of all the drives tested we recommend La Cie's drive."—MacUser

"This is an excellent drive and Silverlining is great!"—D. Jordan
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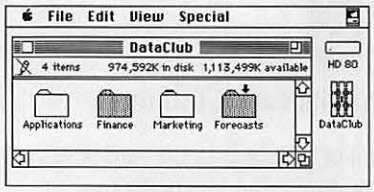
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The key is DataClub's new Virtual Server™ technology, which uses available resources around the network to create one powerful, shared disk that is centrally managed and maintained. And this makes a big difference for you.



The DataClub window opens just like any other disk – only it's shared and secure.

With DataClub:		
Folders are always available	DataClub gives users access to the entire shared file system 100% of the time.	On a TOPS network, mounted folders disappear when machines shut down or leave the network.
Files are easy to get to	All files and folders are found under the single DataClub icon.	With TOPS you have to spend valuable time mounting and searching multiple volumes.
Location transparency	DataClub's Virtual Server technology allows users to access data without having to know on which machine it's physically stored.	TOPS users must know where a file is physically stored in order to access it.
No need for publishing	Just store files under the DataClub icon, and they're available to the network.	TOPS requires all data to be published before it can be shared.
Unlimited scalability	Thanks to its Virtual Server technology, an expanding DataClub network retains its simplicity and actually grows more powerful.	As peer-to-peer systems like TOPS grow, they become more and more unmanageable.
Add users without reconfiguring	DataClub automatically reconfigures the network whenever hardware is added or removed.	On a TOPS network, users have to mount volumes manually every time a new user or disk is added.
Centralized backup	You can back up a DataClub network quickly, easily, and more often – because all shared information can be backed up from any Mac, at any time, without interruption to the system.	By contrast, TOPS requires individual back up of each node.
Nine levels of security options	DataClub provides the highest Apple-approved security you can get – nine levels.	TOPS offers just one.
One password per user	With DataClub you only need one password per user.	With TOPS you need a different password for each folder, adding more confusion than security.
Centralized registered users	DataClub lets you create a single set of users and groups which is valid for all Macs and disks on the network.	TOPS has no support for registered users and groups.
Complete AFP compliance	DataClub complies fully with the AppleTalk Filing Protocol standard.	TOPS does not. So DataClub is compatible with more applications – especially multi-user databases.
Lower cost	Though it's much more capable, DataClub actually costs you less – one third the price of TOPS. And even less than that on larger networks.	Any way you look at it TOPS costs you more time and money.

"TOPS used to be the simpler, cheaper network, but DataClub beats it on expense and setup simplicity."

Phillip Robinson
San Jose Mercury News



DataClub's Virtual Server appears as a single, centralized file server and gets more powerful as it expands.

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Upgrade to a DataClub 3-pack for only $124.76 (only $42 per user). Just call us toll-free with your TOPS serial number, or send/fax us the first page of your TOPS manual. Limit two per customer.

This is a limited-time offer* – so don't wait! Whether you're new to networking or are looking to improve on what you have, place your DataClub order today with a toll-free call. And get network performance that can't be topped!

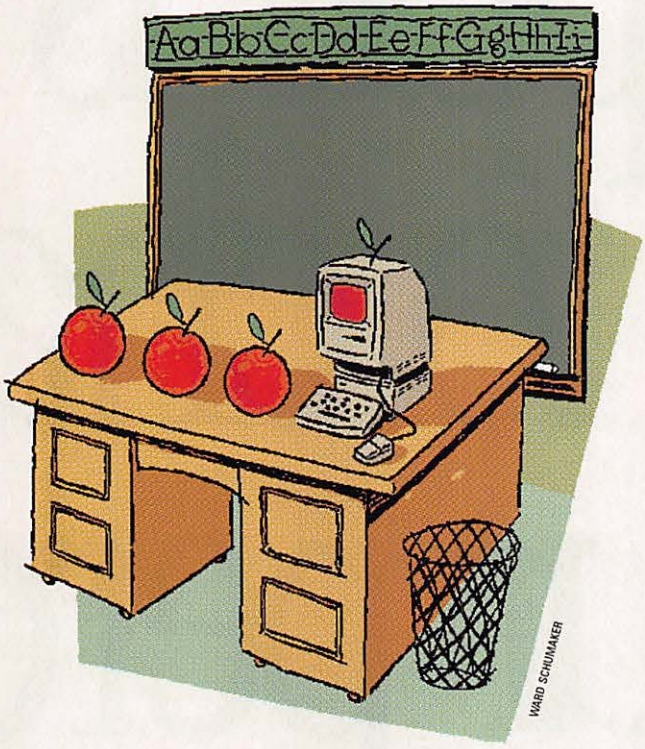
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LETTERS



No Apple for the Teacher

Thank you for your *Commentary* in the January 1991 issue of *Macworld,* a column that reminded us all that the Mac cannot do everything, that we all have wish lists for what the Mac might become.

As a teacher and a Mac fanatic in a small school in rural Maine, I wish for some peace to play on the Mac. The students have taken control of the machines, of the learning in the building—of the building itself if they could. They appear before seven in the morning and leave at ten at night. They clean the room, they form committees, they buy equipment.

Sounds great? When does the poor old teacher get to play? While you want more, my only wish is for the chance to catch up with the students, if only for a moment.

Roger Fuller
Sebattus, Maine

Incorporating the Copyrighted

Thank you for your article "The Future of Television and Computers" [*Commentary,* February 1991]. Some of us have already come up against the copyright beast. If we author HyperCard stacks that quote other sources (such as textbooks) or use graphics that we did not create, we have copyright problems. Do you foresee the same problems when we begin to grab and store frames from the evening news or from that terrific "Nova" or "National Geographic Special" and incorporate them in stacks or other literature? Will we again be shaking a stick at the copyright laws?

Pat Ralston
Indianapolis, Indiana

Generally speaking, appropriating images, text, or music for personal or home use should not present a problem, but distributing multimedia creations that use copyrighted material without permission is prohibited. A copyright attorney can offer more details.—Ed.

Jasmine's Injustice

I am disappointed and angry that you choose to continue carrying Jasmine ads when so many of your readers have been savaged by this company. I bought a Jasmine Direct Drive 20 in October 1988 for close to $600; it failed within months. After three additional failures, two repairs, and a loaner, the drive was returned to Jasmine in July 1990, and by then Jasmine had had the drive longer than I had. In October 1990, I received a letter from Jasmine saying the company would *not* repair the drive, would not return it, and I should buy another for $299. It is obvious Jasmine doesn't care a tinker's damn for its customers. Apparently, neither does *Macworld,* caring instead for the advertising dollar over integrity.

Claire Farrer
Chico, California

Corrections

The correct telephone number for Automated Printing Technologies, maker of Search (New Products, *January 1991) is 309/692-1530 ext. 282.*

Correct pricing for Micro Dynamics' MD Mars System ("The Big Squeeze, January 1991") starts at $70,000.

Etch A Sketch (News, *January 1991) is manufactured by The Ohio Art Company.*

Network SuperVisor ("Managing Networks," February 1991) can scan information from any individual workstation connected to the network and that has the SuperVisor Responder installed, and does not need an E-mail form or application.

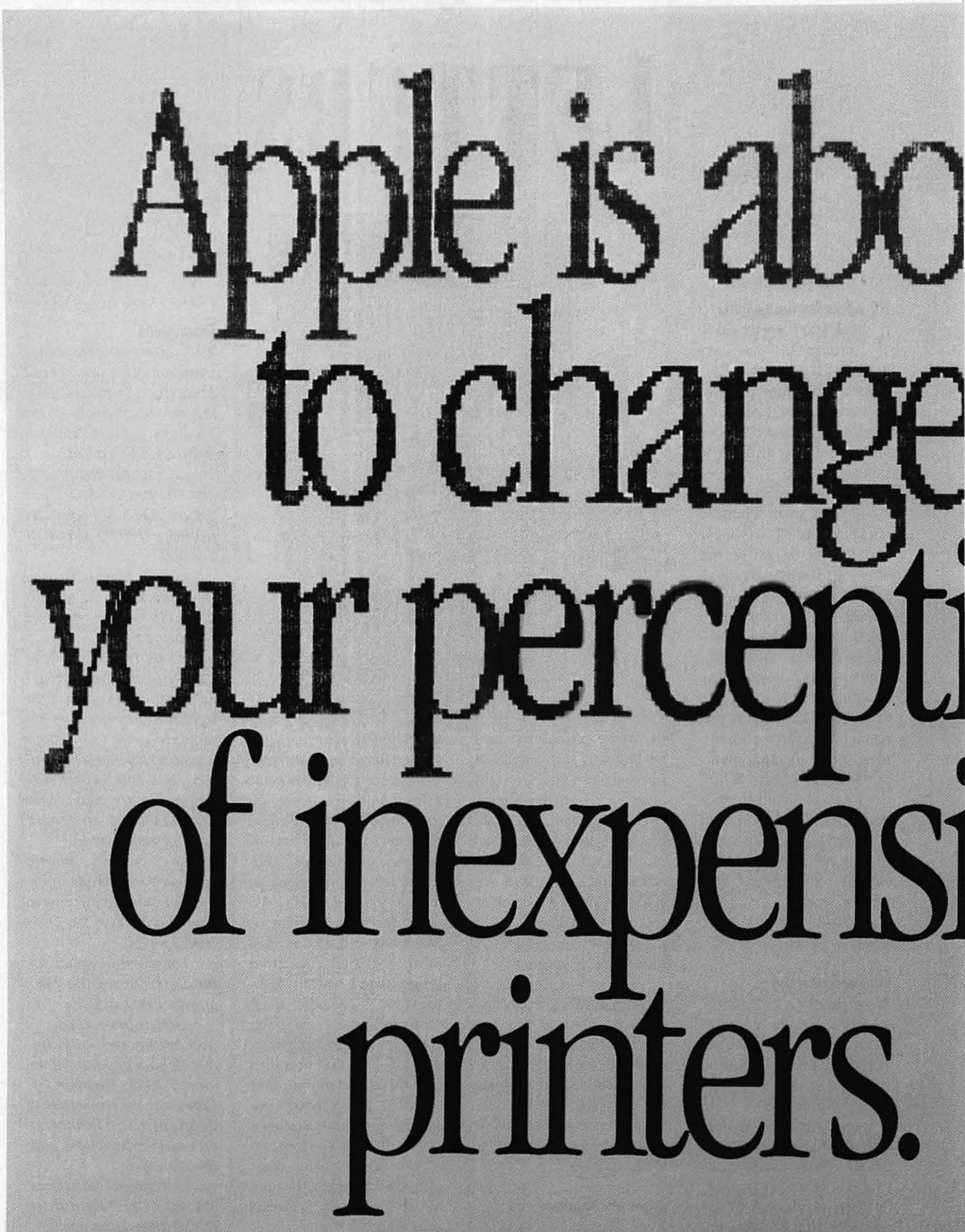
The correct phone number for Metrum Information Storage (Where to Buy, *February 1991) is 303/773-4700.*

The correct price for Finale (State of the Mac, *March 1991) is $749.*

Christopher Cann is not connected with Image Enhancements (News, *March 1991). Neither Dr. Cann nor the University of California, San Francisco, has any connection with the company.*

Storage Dimensions' MacinStor ZFP hard drive ("Midrange Hard Drives," March 1991) has a plastic

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Apple is abo
to change
your percepti
of inexpensi
printers.

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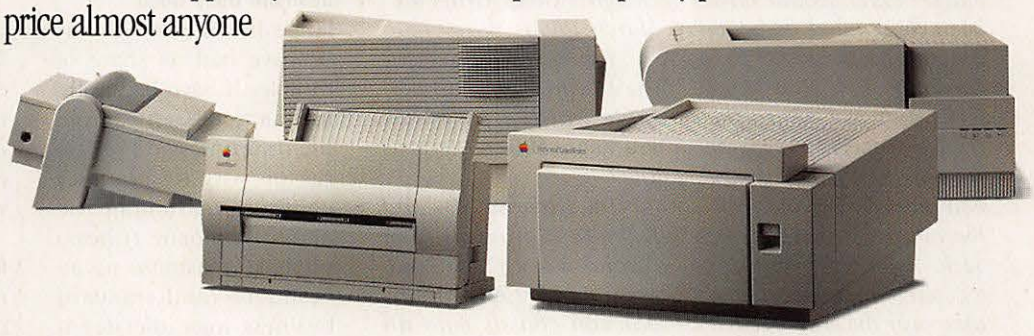
on

ve

It used to be if you wanted a genuine Apple® printer (and all the privileges that go with it), you basically had a choice between two extremes. You could spend a little and get an ImageWriter® II. Or you could spend a lot and get a LaserWriter.®

Not anymore. As of today, Apple offers a complete family of affordable printers:

The new Apple StyleWriter® is a 360-dpi laser-quality printer that combines a price almost anyone



With the addition of the new Apple StyleWriter and Personal LaserWriter LS, everyone has the right to a great image.

can afford with the kind of innovations only Apple can deliver. It's small. It's quiet. It utilizes TrueType™ (Apple's new font technology that lets you scale and print characters smoothly and precisely, from the smallest footnote to the most enormous headline). Yet it costs just $599.* So it's great for students, people working at home, small businesses, or anyone who needs confidentiality when they're printing.

The new Personal LaserWriter LS is a full-fledged, no-compromises, four-page-per-minute LaserWriter. It uses a built-in, high speed serial port, so it won't be slowed down by complicated pages. It also incorporates TrueType. It prints in the background, so you can be working at the same time it is. And it offers a major breakthrough for a LaserWriter: a price of just $1299.

And while our other laser printers aren't new, many have new, affordable prices:

The Personal LaserWriter NT is our least expensive, networkable PostScript® LaserWriter. It's ideal for complex graphics. And for small groups of people.

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case, and its dimensions are 9.75 inches wide by 2.8 inches high by 10.5 inches deep.

The following products on the "Hard Drive Speed Tests" chart ["Midrange Hard Drives, Just Right," March 1991] should have been designated as being among the fastest 10 percent: the Club Mac Hard Disk 170 for Save; the FWB hammerFMF 155 for SCSI Evaluator Read, SCSI Evaluator Write, and Seek; the Microtech Nova 120 for Seek. The SCSI Evaluator we used measures seek time over the entire geometry of a hard disk. The FWB hammerFMF 155 is a 300MB hard drive that formats to hold only 155MB, reducing the area on the disk that the head must search to find data. Retesting the drive, with an FWB test utility that takes the reduced data storage area into account, gave us a faster seek time of 8.6 milliseconds.

David Rumfelt used Canvas to create Cellular Design ("Great Graphics," March 1991).

*The correct price for the Athena A50 50MB portable hard drive (*New Products, *March 1991) is $899.*

*The Expanse NB4 and Expanse II products from Second Wave (*New Products, *March 1991) are expansion chassis with an internal power supply, fan, and logic board.*

*The correct phone number for Liberty Systems (*Where to Buy, *March 1991) is 408/243-2885; fax 408/983-1127.*

*The correct telephone number of It's Alive, the publishers of IA MediaTracks Guides (*New Products, *February 1991) is 617/437-7965.*

.

Jasmine Does Good

The Jasmine of old may have had its share of troubles. I have had nothing but good service from the company, and I see no reason why it shouldn't continue. Assuming the parent company (Chess) wants to maximize its investment (and standard business logic dictates it should and will) the new Jasmine will surely strive to win back their lost market share with better than average pricing (which is happening) as well as outstanding customer service, which, as I have related, has happened with me.

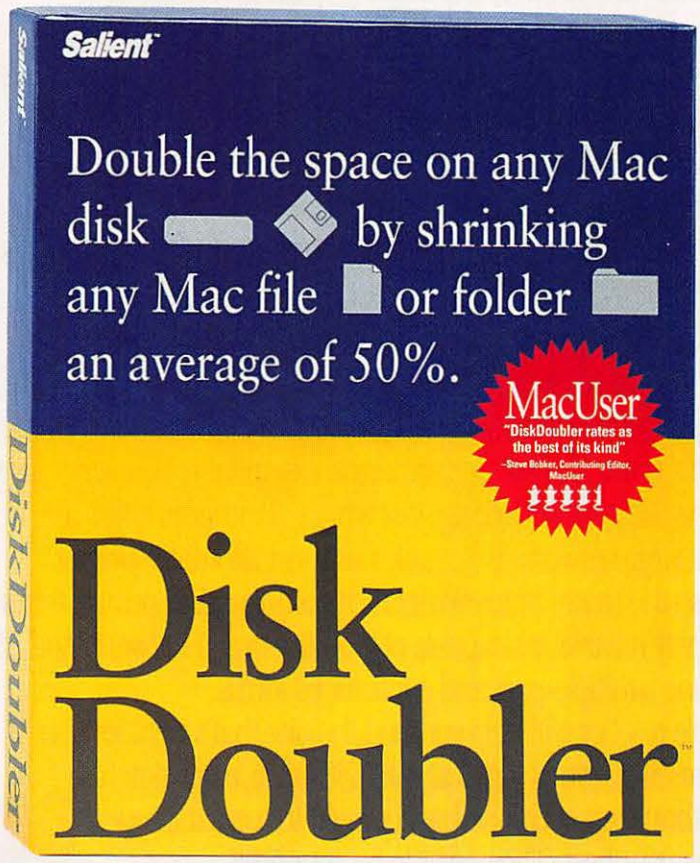
Roger Krost
Pasadena, California

Turning the PageMaker Text

The review of PageMaker's and QuarkXPress's rotation abilities ["Page Wars," February 1991] made it sound as if text could not be edited once rotated in PageMaker. Text can be edited after rotation, very easily.

Using the Text Rotation feature under the Elements menu, rotate the text. While the text is still selected, press ⌘-E to get into Story view. Select the text with the I-beam that automatically appears, then edit it to your heart's delight by selecting attributes from the

(continues)



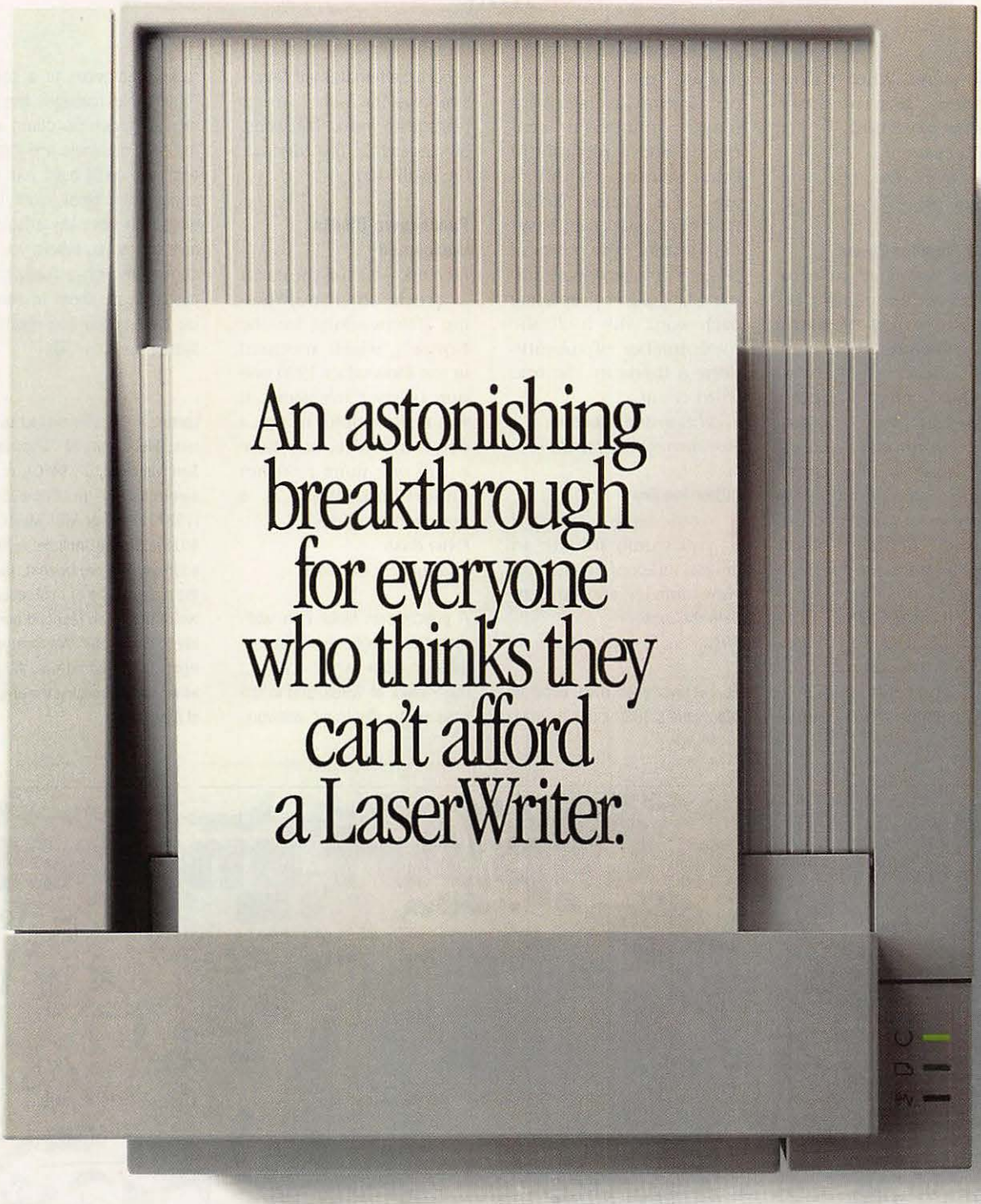
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Reclaim megabytes of disk space with DiskDoubler.

Available at leading software stores. Salient Software, Inc., 124 University Avenue, Palo Alto, CA 94301 (415) 321-5375.

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Circle 39 on reader service card.



The new Personal LaserWriter LS.



At just $1299,* it's the most affordable LaserWriter® in our history. But don't let the low price fool you. Inside is a full-fledged, no-compromises Apple® LaserWriter.

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And it was designed to let you get everything out of your Macintosh® that Apple builds into it.

Now more desktops can have the power of a LaserWriter. The power to be your best.®

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Type menu. When you're finished, click the Story window close box.
Deb DeCosta
Manchester, New Hampshire

Nisus Number Power

I was very glad to read Steve Cummings's favorable review of Nisus 3.01 [*Reviews,* February 1991]. However, there is one important point where the review was in error. Mr. Cummings stresses that there is "one useful feature conspicuous in its absence—a word-count routine." Actually, Nisus gives the user two different methods of obtaining a word count. The first method is to simply select the Get Info menu command. The resulting dialog box provides word counts and gives the total number of characters, average word length, number of sentences, and a plethora of other statistics. Additionally, the Count Words macro supplied with Nisus demonstrates the power of Nisus's macro-programming language by replacing each word with itself; the total number of substitutions is therefore the true word count.
Todd Cranston-Cuebas
San Marino, California

Index Inquiry

I would appreciate it if you would initiate an annual index of product reviews, articles, and subjects.
James Gardner
Moss Beach, California

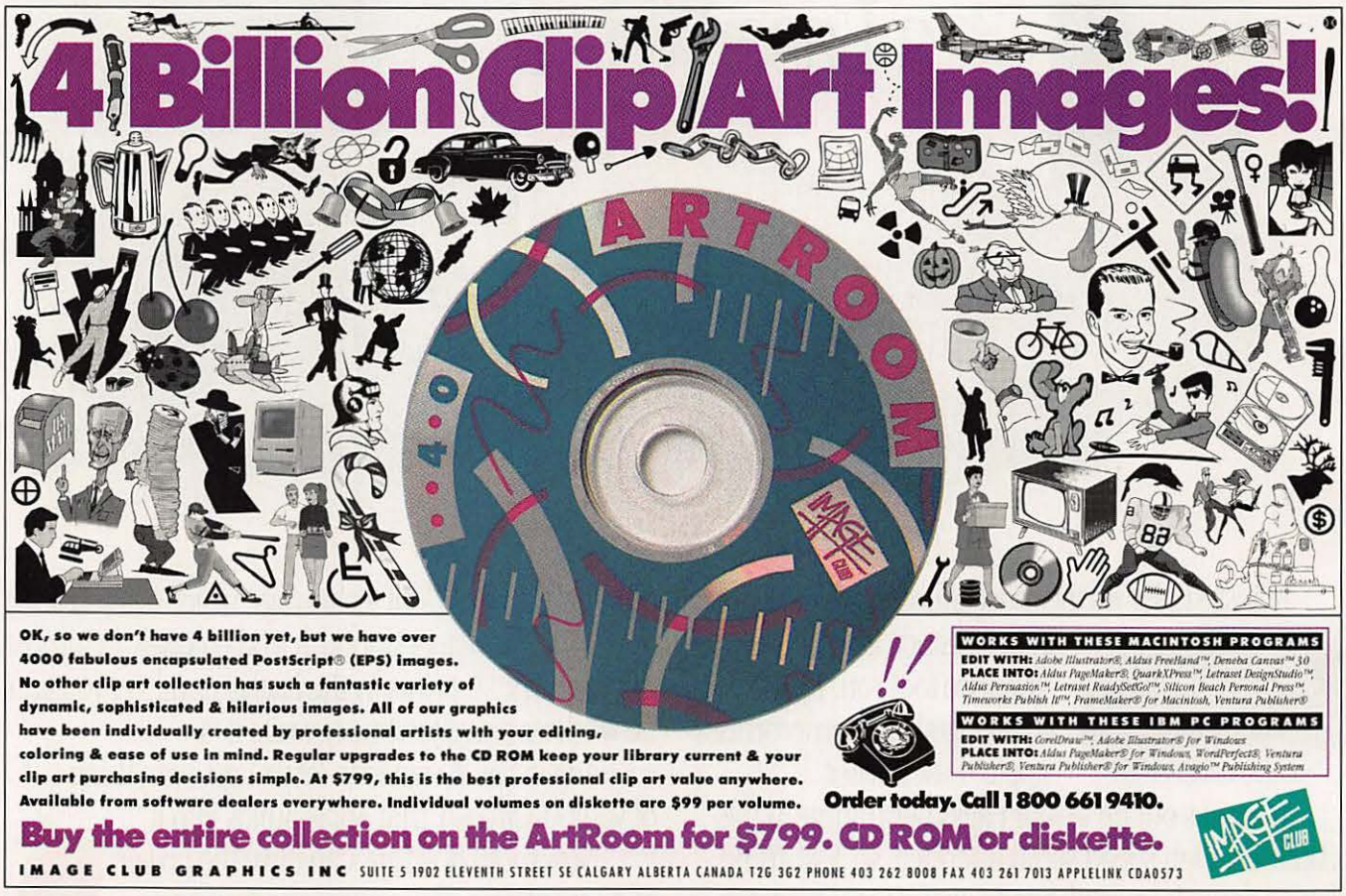
To receive your own copy of *Macworld*'s 1990 index by mail, send a self-addressed, legal-size envelope with 75 cents postage to Index, *Macworld,* 501 Second St., San Francisco, CA 94107—Ed.

Punchdown Blocks Uncloseted

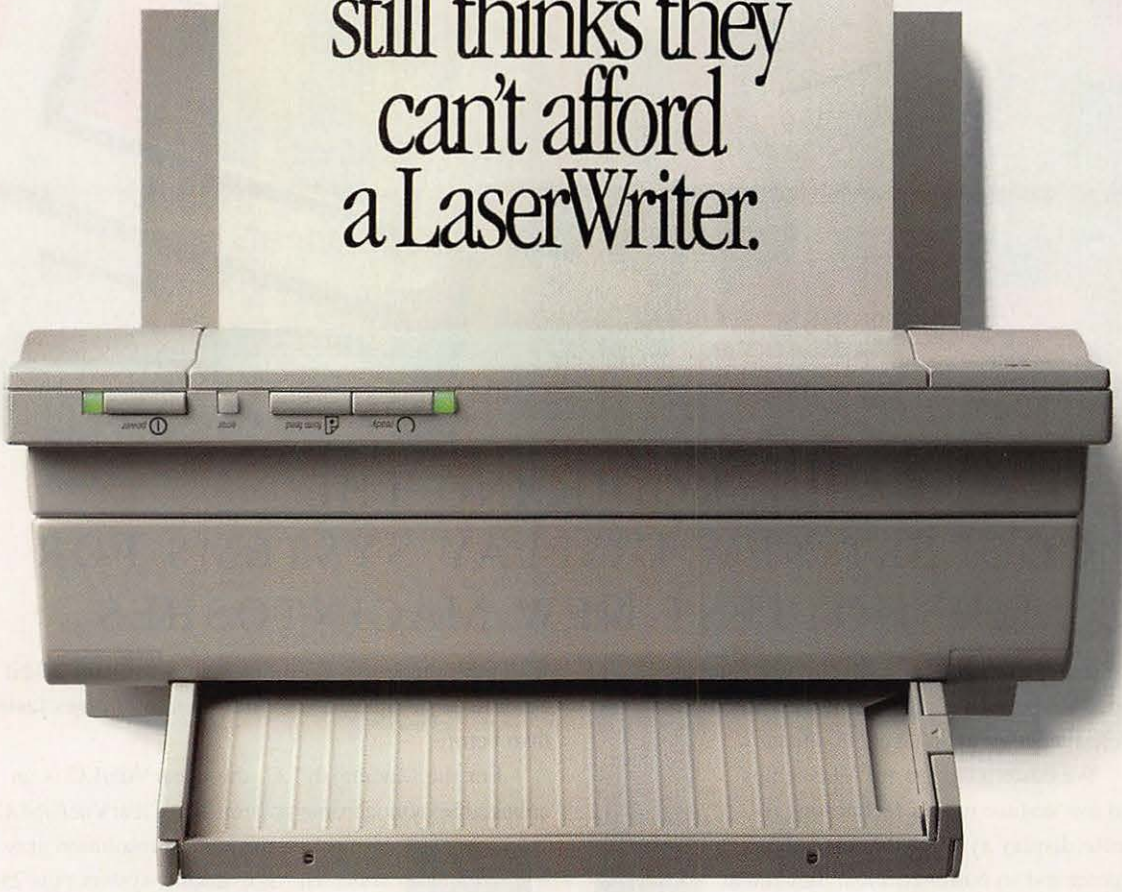
Thank you for the great article about networking ["Networking for the Novice"], which appeared in the December 1990 edition of your magazine. It was really helpful to me, a network novice, but there is still one thing I do not understand. What is a punchdown block?
Kaya Bush
Maulburg, Germany

A punchdown block is a wall-mounted telephone-wiring distribution block used to connect many pairs of wires, and in the case of an electronic network, to link the wires to a central "brain" that manages the network. Though no doubt with the right materials and instructions you could build your own punchdown block, your local telephone company should be able to tell you where you can obtain one, since many office buildings use them to centralize their phone and electronic systems.—Ed. ■

Letters should be mailed to *Letters, Macworld,* 501 Second St., San Francisco, CA 94107, or sent electronically to CompuServe (70370, 702) or MCI Mail (284-8078). Please include a return address. We regret that, due to the high volume of mail received, we're unable to respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld.*



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Introducing the Apple StyleWriter.



At $599,* the new Apple® StyleWriter® offers laser-quality printing for about the same cost as that of a dot matrix printer.

And while the StyleWriter calls attention to your work, it won't call attention to itself. It's small (just 13" wide by 8" high by 5" deep). It's quiet. It utilizes Apple's new TrueType™ font technology, so you can scale and print characters smoothly and precisely in any size type, from the smallest footnote to the most enormous headline. And when you hold pages printed on the StyleWriter next to those from printers costing thousands of dollars more, you'll be hard-pressed to tell the difference between them.

So what if you can't afford a LaserWriter®? You've still got the power to get the most out of your Macintosh®. The power to be your best.®

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RasterOps 8LC Display System and 24si Display Board

Ad produced on the Macintosh



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Every time a hot new Macintosh® computer is announced, we're out there first with the coolest technology in display systems.

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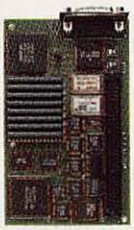
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Our new 19" display systems bring 8-bit color, as well as monochrome and gray scale, to the Macintosh LC.

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ART BEAT

by Cathy Abes

The tools and the talent behind Macworld's graphics and the techniques that make them possible



The illustration that opens the feature "Setting Traps," on page 159.

Artist: For the artwork opening our feature on color trapping, *Macworld* associate art director Sandra Koenig used a collage of letters in a variety of fonts and sizes to illustrate trapping techniques. By adding a thin sliver of color to the edge of an element, trapping prevents the unsightly white spaces between two adjacent color elements, caused by press misregistration. Koenig needed to show a bitmap letterform on a patterned background, light-color letterforms on a contrasting (darker) background, and letters that straddled both white and colored backgrounds. She used trapping techniques in creating all the letters.

Hardware: Mac IIcx with 8MB of RAM and an 80MB internal hard drive.

Software: Aldus FreeHand 2.0, Adobe Photoshop.

How It Was Done: The artist began by formulating a composition, then creating rough sketches in FreeHand. When she was ready to start the actual illustration, she first drew a black box in FreeHand. Then she assigned a process-color line and fill of red and cloned the rectangle. She used the scale tool to resize the clone to 50 percent, and changed the fill to white and the line to none, to create a small white box in the lower right corner of the red rectangle. Then she cloned the white box, moved the clone to the upper left corner, and aligned all the boxes.

Now she was ready to create all the letterforms (except the green *T* and the *M,* which were done in Photoshop). To create the wavy line of letters, Koenig first typed them in with the type tool, then in the Type Specs box assigned a process color, and with the line of type selected, dragged its anchor points to letterspace it. Next she created a path with the freehand tool, then selected both elements and joined them. Koenig used the scale tool to make the *e* and the *S* the exact height and width she wanted. For the *Z,* she first used the scale tool, then angled the letter with the skew tool, and finally, used the rotate tool to place the letter in the correct position. After Koenig created all the letters, she put each one on a different layer to create an overlapping effect.

Next Koenig used Photoshop to create the backgrounds for the two upper boxes. She gradated the pink one and selected the Noise filter (under the Image menu) several times to add texture. To create the other box, she chose black and dragged a wide brush across the box (first Shift-clicking to get a straight line). Then Koenig selected the whole image and selected the Blur filter (Image menu) to soften the stripes' edges. After adding noise for more distortion, she lowered the brightness by selecting Adjust Brightness & Contrast from the Adjust submenu (Image menu).

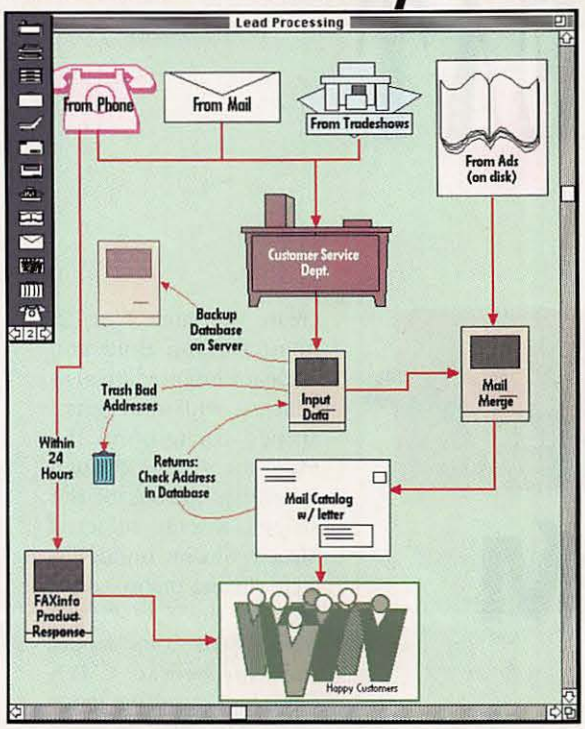
Still in Photoshop, Koenig used the type tool to create the large *T* in 72-point Oblong Bold and made it a brighter green to contrast with the muted striped background. To make the *T* large enough to overlap several of the stripes, Koenig selected Stretch/Shrink under Effects (Image menu). After creating the *T* in Photoshop's RGB Color mode, she switched to CMYK Color and saved the letter as an EPS file. She followed the same process for the red gradated background and the black *M* on the white background.

Then Koenig placed each Photoshop file into FreeHand, sized the images, and moved them into place. She used FreeHand's Paste Inside command to place the striped rectangle within the white box in the upper left corner, which she had originally created in FreeHand. This was a quick and easy way to shrink the striped box to exactly the right size, since pasting inside kept the striped box from extending past the borders of the white box.

Finally, it was time to put the color trapping techniques to use on each of the letterforms. Before the wavy line of type could be trapped, it had to be unjoined from its path by selecting Split Element under Special (Element menu). With the letters selected, Koenig chose

(continues)

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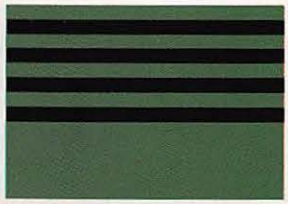
Mainstay

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Circle 284 on reader service card.



The *Z* was created with the type tool, scaled, then angled with the skew tool, and finally rotated into the desired position.



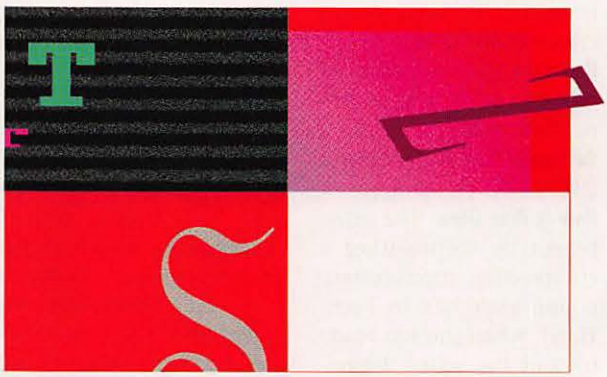




To create the striped box, Koenig painted black lines with a wide brush over a green background (Shift-click and drag), then used the Blur filter and the Noise filter to add texture, and lowered the brightness for a muted effect.

Type Specs under Effects, and then selected Fill and Stroke. She then set a half-point stroke the same color as the fill, and checked Overprint.

A special, more complex trapping technique was used for three of the letters that overlap white and color backgrounds—the *S*, the *Z*, and the pink *T*—since only the part of each letter adjacent to the color background was to be trapped. First Koenig cloned the original letter, in this case, the *Z*. Then in the Type Specs dialog box (Type menu), she chose the same fill, stroke, and overprint settings as she had for the other letters. Next she cut the clone. Then Koenig selected the large red rectangle and cloned that. After selecting None for both Line and Fill (Fill menu) to create a clear, invisible rectangle, she used the Paste Inside command to paste the cloned letter *Z* inside the invisible cloned rectangle. As a result, the original *Z* (which did not extend past the color background) was trapped, while the cloned *Z* (against the white background) was not. ■



After cloning the *Z*, the artist set a half-point stroke and checked Overprint, then cut the clone. Next she made an invisible clone of the red box and pasted the cloned *Z* inside the cloned box. As a result, the original *Z* (which overlapped only the color background) was trapped, while the clone (which extended into the white) was not. Here you can see the original *T* and *S* without their clones and the *Z* with its clone.

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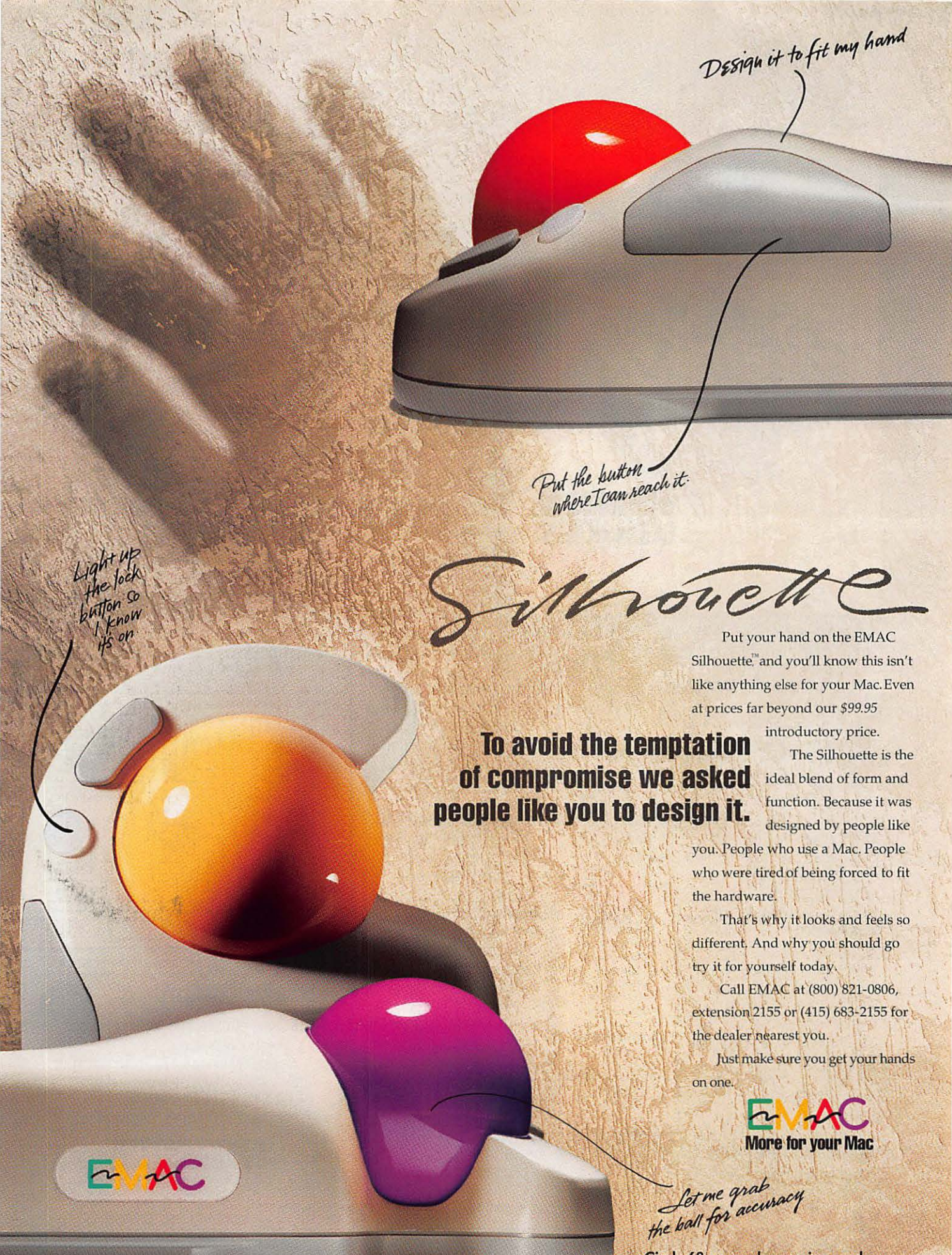
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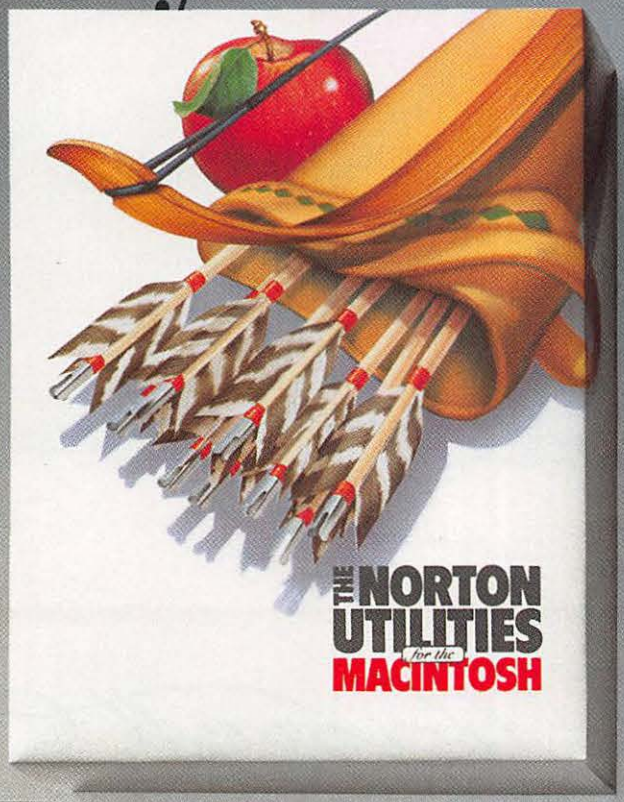
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Any resemblance to other Macintosh utilities is pure coincidence.



If that sounds like an outrageous statement, it sure is.

But then, this is one outrageous set of utilities.

In fact, comparing the Norton Utilities® for the Macintosh® to anybody else's utilities for the Macintosh is, well, kind of embarrassing.

Because when it comes to fixing your disk problems, rescuing your data and daily getting the utmost from your Mac,® nobody else even comes close.

Why you need a Doctor in the house.

To see what we mean, see what happens when you call up our revolutionary *Norton Disk Doctor.*®

Which is what you'll do whenever you're having trouble doing things like booting your system, recognizing or reading disks, opening, closing or trashing folders, locating icons or launching applications.

The Disk Doctor automatically diagnoses and repairs the 45 most common—and dangerous—problems your disk can confront you with.

Including a whole bunch of things the other guys can't even detect, let alone repair.

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We save your trash.

Of course, any time a human being uses a computer—yes, even a Mac—there's a risk of losing data.

Which is why, seven years ago, Peter Norton Computing invented the legendary *UnErase.*®

Like the rest of the tools in this box, UnErase has been designed expressly for the Mac, to recover more kinds of trashed files, more quickly and with less effort on your part than any other program.

You can UnErase by File Type. By Text Search. Or use Quick UnErase to scan your fully loaded hard drive in as little as five seconds.

(You don't even want to know how long it takes everybody else.)

Whether your drive is fully loaded or nearly empty, *Speed Disk*™ is —here we go again—the quickest, easiest and safest way to dramatically accelerate disk access.

And unlike other programs, Speed Disk won't lose your data even if your Mac loses power.

What a find.

Of course, you don't have to lose your data to want to get at it as quickly as possible.

That's something you want to do every day, every time you open a file.

So you'll be interested to know that *Fast Find* locates and opens files so quickly, you may never use the Mac's standard Find File accessory again.

If all of this looks too good to be true, see your favorite software dealer for a demonstration.

If you haven't got a favorite software dealer, call us right away at **1-800-343-4714 Ext 703G.**

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The remarkable Norton Disk Doctor automatically diagnoses, reports and repairs the 45 most common—and dangerous—disk problems. It even tells you when it's time to run our Speed Disk utility and optimize your Mac's performance.



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*Total times to recover a reformatted 40MB Quantum® internal hard drive on a Macintosh IIcx with respective volume information files installed.

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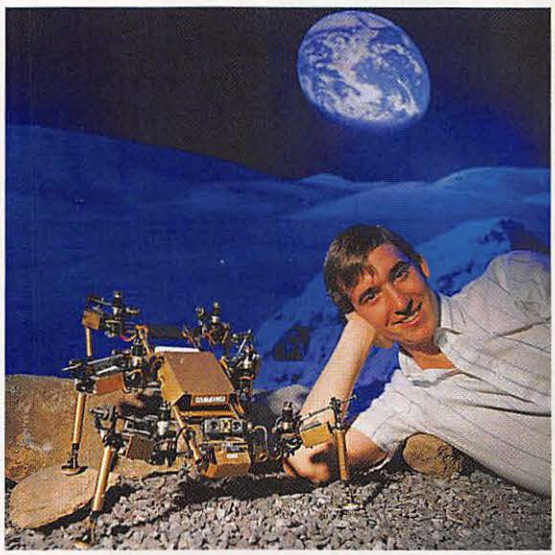


Life in the Anthropomorphic Lane

OF ANTS AND VIRUSES AND ROBOTS ON MARS

BY STEVEN LEVY

At 14 inches long and a foot wide, Attila II is bigger than your typical insect. But like a common, self-respecting grasshopper or roach, Attila II has legs and knows how to use them. Like an insect, he can walk, jump, and even recover, with a modicum of grace, from a fall on his back. But unlike an insect, he has a metal chassis, 150 electronic sensors, and a self-contained computer communication network. The program that determines his behavior—the equivalent of the genetic rules that determine the behavior of an ant or bee—is written on a Macintosh and injected into Attila's chips. And one day Attila may go to Mars.



BILL O'CONNELL

Colin Angle plans a life on Mars for his creation, Attila II.

Attila II is a robot. To most of us that term connotes either the wisecracking anthropomorphic creatures in sci-fi flicks, or the utilitarian precision arms you find in any sort of factory in Japan. But Attila's creators at MIT's Mobile Robotics Lab have something else in mind. Their methodology is to borrow liberally from nature in order to build robots that display independent behavior in the same way animals do. Using a so-called bottom-up approach in which complex, and potentially useful, behavior emerges from simple rules, they believe their creations offer not only a fresh alternative to conventional robotics but also a more useful one, in which robots will be able to go about their business without the need for constant supervision from human beings. And if that's not reason enough to build an artificial insect, Colin Angle, the wizard in his early twenties who crafted Attila's hardware, gives the ultimate rationale: "Because it's incredibly cool."

Artificial Life

That it is. But the effort is also part of a revolutionary new field of science: artificial life. As defined by its chief proselytizer, Christopher G. Langton at the Los Alamos National Laboratory, A-life refers to "the study of man-made systems that exhibit behaviors characteristic of natural living systems." This sounds rather benign until you seriously begin to consider the potential ramifications of these man-made systems. Because many A-lifers believe that those systems will one day be truly alive. As alive as bacteria, ferns, grasshoppers, sea urchins, and Madonna.

"Within fifty to a hundred years a new class of organisms is likely to emerge," writes J. Doyne Farmer, also of the Los Alamos National Laboratory. "These organisms will be artificial in the sense that they will originally be designed by humans. However, they will reproduce, and will evolve into something other than their initial form; they will be 'alive' under any reasonable definition of the word."

But we don't have to wait until late in the twenty-first century to get a taste of what artificial life might be like. As it turns out, there are a slew of working examples of A-life that provide a flavor of what our silicon-based off-

(continues)

spring might be like. Some of them are based on the Macintosh. Some of them *live* in the Macintosh. So let me whisk you around on a guided tour.

Wonderful Toys

The first stop takes us to the world of cellular automata, a checkerboard-based mathematical universe that proceeds in discrete time-steps. Whether a given square in the board is "born," continues "living," or "dies" depends upon which neighboring squares are occupied in the current time-step. Amazingly, simple rules yield complex behavior, fascinating patterns, and ultimately lifelike behavior, though not nearly lifelike enough to make you feel guilty when you shut off your Mac. I've discussed these phenomena before (*The Iconoclast,* April 1990), but whereas I previously bemoaned the lack of a good Macintosh program for generating these simulations, now I can happily announce that an Apple engineer named Ken Karakotsios has produced CASim, a full-featured package that allows not only for browsing but also some serious experimentation.

Climbing up the great chain of artificial being, the idea that complex behavior can evolve from simple rules makes for some fascinating theory. One of the more charming manifestations of this is a bewitching book called *Vehicles: Experiments in Synthetic Psychology* (MIT Press, 1986) by Valentino Braitenberg. Braitenberg is the director of the Max Planck Institute of Biological Cybernetics, and while he calls his book "an exercise in fictional science," it conveys the very real phenomenon that what we consider lifelike behavior can come from a few ridiculously elementary initial conditions. He postulates imaginary vehicles—little toy cars wired with various motors and sensors. In Braitenberg's scenario, once you combine a smattering of these low-tech parts, suddenly the vehicles start acting like creatures, displaying aggression, cowardice—even affection.

The software program that accompanies the book lets you convert this thought-experiment into reality, or at least the sort of reality that exists on the screen of a Macintosh. Using the experiment called Love and Hate, you wire the vehicles to move differently according to which sort of "pit" you place on the computer playing field. Place your vehicles—which look like contestants in a vintage soapbox derby—on the field, and watch as they spin around the pits, or toward the pits, or away from the pits, in ways you might not have considered. Obviously, these are not living critters—but your anthropomorphic tendencies will be tickled nonetheless.

Agar and Ram

One fan of vehicles is Mike Travers, a graduate student at MIT's Media Lab. Using not only Braitenberg's ideas but also the experience of Alan Kay's Vivarium project and the "Society of Mind"

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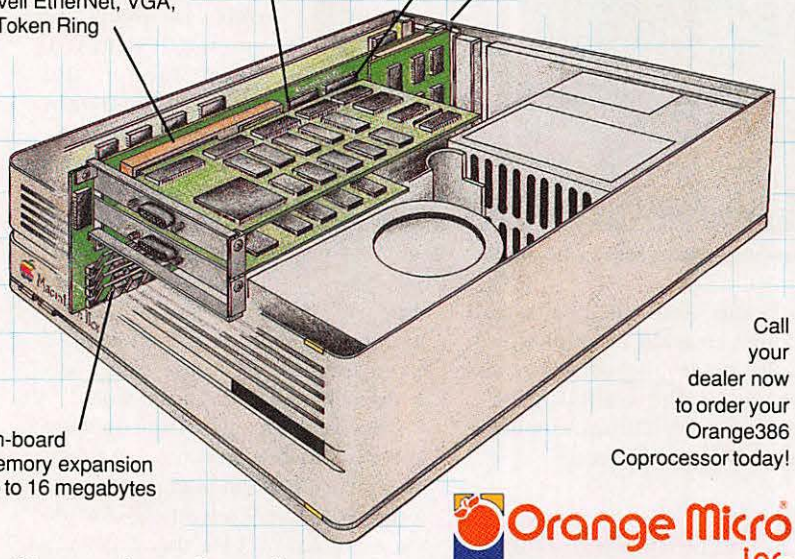
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theories of artificial-intelligence guru Marvin Minsky (who is also Travers's thesis advisor), Travers has created Agar: An Animal Construction Kit. Travers hopes to build all sorts of animals with this; currently ants spring from the Mac II that runs the program.

Travers's work places him among those who believe that by creating animals that live inside the computer, we can better understand the way real animals behave. So after spending a lot of time in his backyard watching ants, and reading the works of the great entomologists like E. O. Wilson, Travers began to implement artificial ants, using computer agents to direct their behavior. In keeping with the spirit of artificial-life experiments, he didn't assign an overall goal to the ants—something like "find food and recruit other ants to help you get it back to the nest." That would be a top-down thing to do, frowned upon by A-lifers. Instead, he broke down this complex task into simple behavior and let the difficult part emerge. This is the preferred bottom-up methodology, reflecting how real life evolved.

So when you see Agar running, the on-screen ants may not be as focused as real ones—they seem to be more easily distracted, for one thing—but eventually they discover the virtual food planted somewhere on screen and leave a chemical trail as they head back to the nest. Then other ants come across the trail, and collectively the ants can gather all the food and return it. When the user tires of seeing the ants crawl around, he or she can select an alternative view that shows which software agent is active at a given time. (A software agent is a computer factotum that performs tasks independently. For instance, if an ant comes across food, the agent for moving the ant's pincer to pick up food will be activated.)

Is this the way real ants behave? Actually, ethologists (the zoologists who study animal behavior) are divided on this question. Indeed, Travers has had requests for his software from ethologists who think this type of computer project can shed light on the doings of real creatures.

If Agar has some potential utility, consider an artificial-life program that has already proven valuable in the real world. It is called Ram and is a product of biologists and computer scientists at UCLA. The idea is to model population behavior and evolution, operating from the premise that living organisms are similar to computer programs. "Just as organisms are born, live, learn, interact with each other, reproduce with modification, and die, so too can animal programs initiate, execute, learn, communicate, interact with environment programs, replicate with modification, and terminate," says one paper describing the system. This is not just for fun—since Ram allows one to accurately model organisms in certain environments, it has proven useful in predicting the behavior of certain

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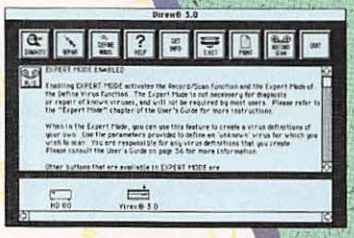
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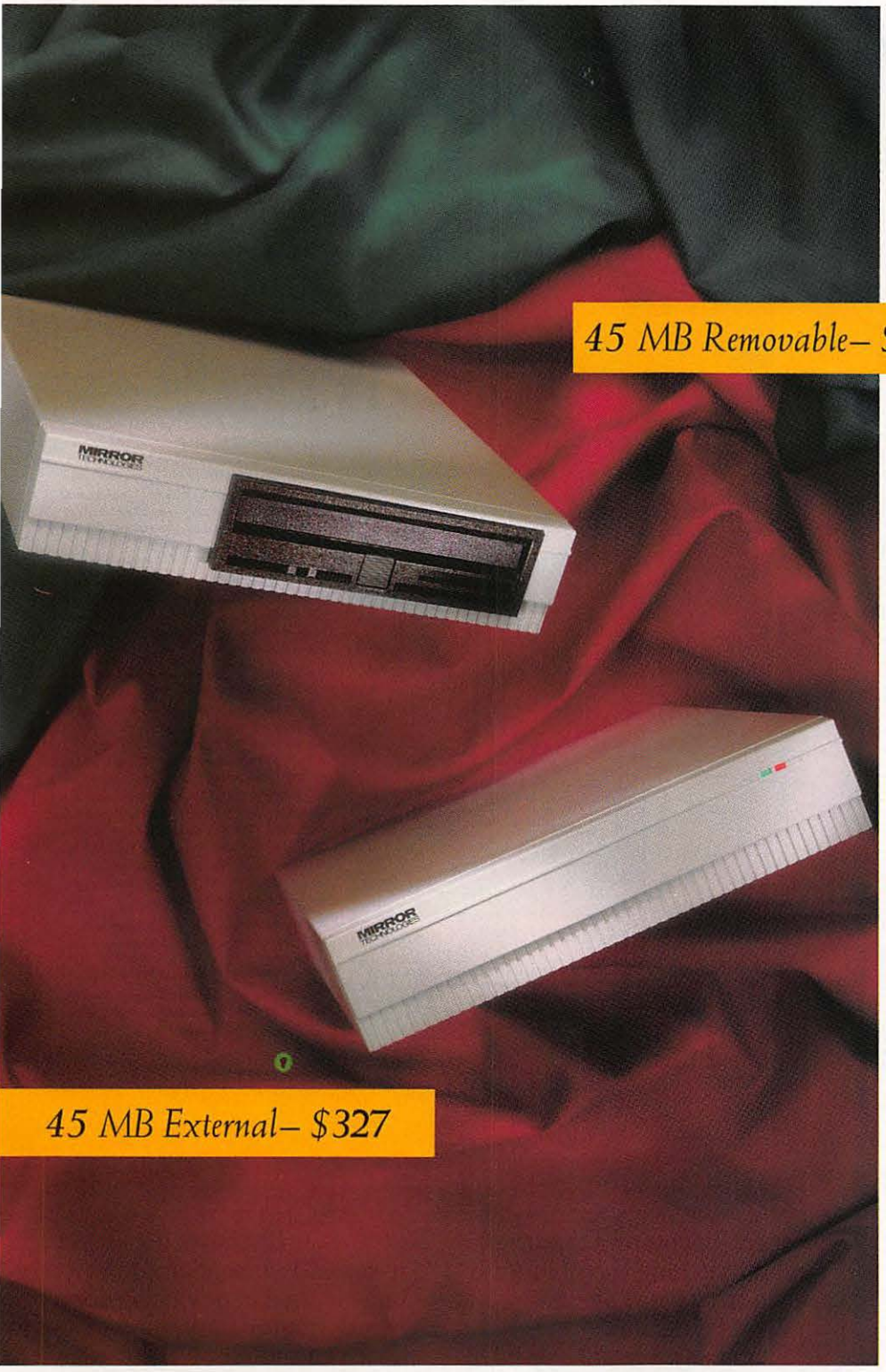
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chapter 15 THE DISAPPEARING RAIN FORESTS

Most tropical forests form a green band around the earth's center extending roughly 10 degrees north and south of the Equator. Amazing as it may seem, these forests occupy less than eight percent of the Earth's entire land mass, yet they account for nearly half of all the growing wood on the planet and are the home for two fifths of Earth's animal and plant species. It is because of the amazing diversity of species that the rain forests are so important to mankind for we rely on these for agriculture, medicine, and industry.

15.1 Natural Source of Products

At least a quarter of all pharmaceutical products are derived from tropical rain forests. An even more impressive statistic when you consider that less than one percent of all Amazon plants have been intensively examined for their medicinal properties.

Tropical rain forests have provided man with treatments for leukemia, Hodgkin's disease, breast, cervical, and testicular cancer as well as a wide array of analgesics, antibiotics, heart drugs, enzymes, hormones, diuretics, anti-parasite compounds, ulcer treatments, dentifrices, laxatives, dysentery treatments and anticoagulants. Of the 90,000 plant species in Latin America, only 10,000 have been tested for anti-cancer properties. Scientists expect that at least ten percent of the untested plants will reveal some form of anti-cancer activity. A species of alexa tree, found in the northern Amazon basin and Madagascar contains the plant alkaloid castanospermine which is being studied at St. Mary's hospital in London as a possible treatment for forms of AIDS.

Vast quantities of rubber from the rain forests provide such mundane items as tires, gum, and running shoes.

1950 2000 2025

Figure 15.1 From 1950 to 1975, the amount of the earth's surface covered by tropical rain forest declined 15% to 12%. It is predicted to decline to 7% by the year 2000, and to 4% by the year 2025.

15.2 Thousands of Diverse Species

The rain forests are the most complex and diverse ecosystems in the world. A one and a half hectare of rain for-

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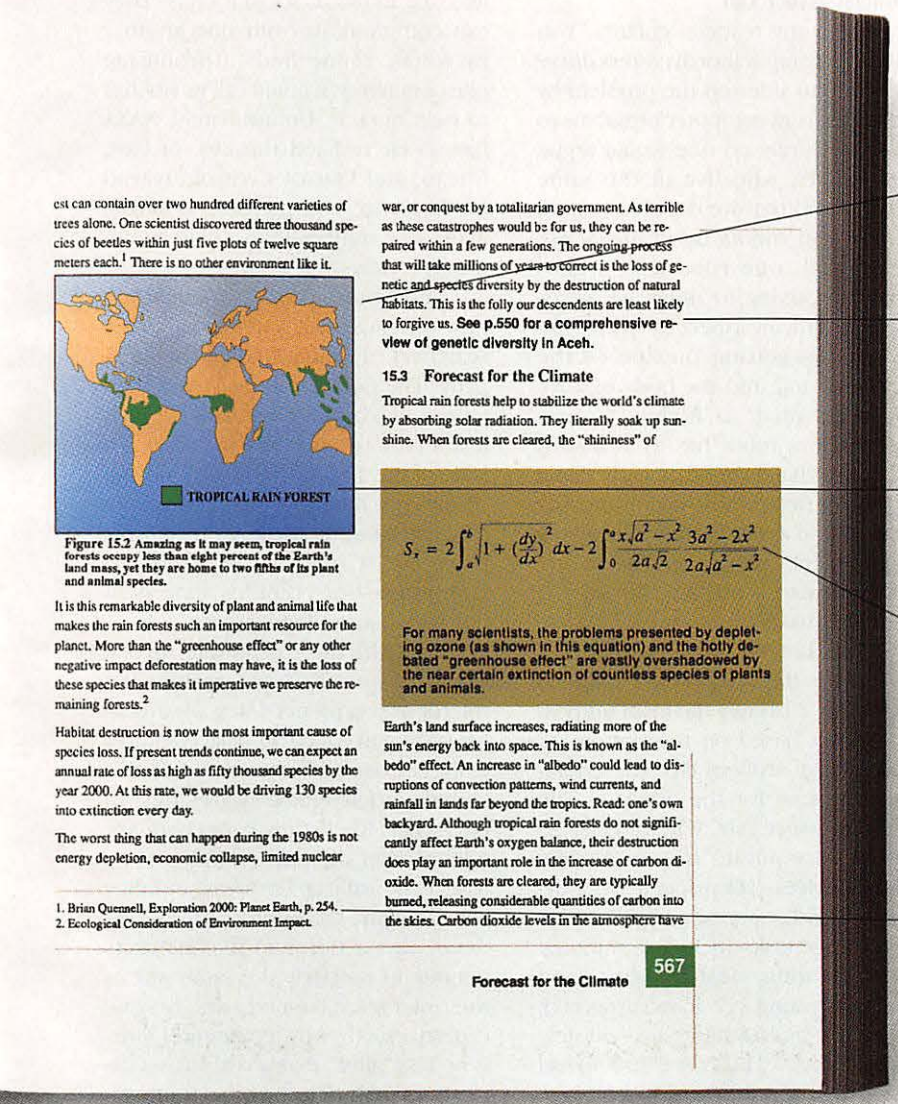
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animal populations. For instance, mosquitoes. Using Ram, the UCLA researchers, including biologist Charles Taylor, modeled the various factors of the mosquito population of Orange County, California. By projecting the behavior of the population, they were able to suggest more efficacious ways of pest control.

Artificial Insect Lab

I can hear my readers' guffaws. You call these computational critters *alive?* Allow me to sidestep the problem by switching from computer programs to robotics. Surely no one would argue that robots, who live in the same messy world that we do, are not real.

But can robots be in any sense alive? Well, one roboticist argues that when trying to duplicate a particularly difficult aspect of living—intelligence—getting outside of the computer and into the body of a robot is essential. As Rodney Brooks explains it, a robot has to deal with the same challenges that early living organisms dealt with—mainly moving around and coping with an earthly environment. That's what made animals so smart; and that, he says, is what will make robots smart.

What Brooks says matters, because he is the head of MIT's Mobile Robot Lab, currently the main outpost of robotics based on the bottom-up principles of artificial life. The unofficial nickname for the group is The Artificial Insect Lab. Why insects? As Brooks once put it, "Insects are very robust devices. They operate in a dynamic world, carrying out a number of complex tasks including hunting, eating, mating, nest building, and rearing of young. . . . Insects succeed. No human-built systems are remotely as reliable. . . . Thus I see insect-level behavior as a noble goal."

Though not all the robots from Brooks's lab look like insects—some are wheeled things with an R2D2 flavor—one of the big ideas floating around the lab is that small, autonomous, insectlike robots with behavior based on a hierarchy of simple rules can yield big results. Their motto is Fast, Cheap, and Out of Control, and Brooks's minions see their tiny robots—some are as little as 1 inch square and are dubbed "gnat robots"—as silicon Davids tackling the pickup-truck-size products of rival labs.

A case in point is Attila II, the creature described earlier. Brooks's idea is to send a shipload of Attilas to Mars and let them loose to perform certain useful tasks, such as exploration or gathering samples. Once on the planet, Attilas are expected to form a society, utilizing a swarm intelligence like that found in social insects. They can communicate with one another by sonar; if one finds a promising pile of minerals it could call its siblings to help mine it. Unfortunately, NASA has so far resisted the lure of Fast, Cheap, and Out of Control, instead funding two projects to send single, giant-size multimillion-dollar robotrucks to Mars.

Undaunted, the MIT people are now offering their wares to other researchers, through a California company. The deluxe roboticist will want to look into buying an Attila II. Though it will cost as much as $50,000, it is a state-of-the-art artificial insect, moving on six legs, jumping, recovering from falls, and capable—depending on what programs it holds in its on-board computers—of complex emergent behaviors, including learning.

Even with those behaviors, no one would call Attila II a living creature. But the robot represents a step toward an ecosystem in which artificial creatures truly coexist with real ones. If this sounds farfetched, consider this: in one sense, it's already happened. Ask A-lifers what currently comes closest to a "real" artificial life-form, and they usually reply, "computer viruses." Indeed, those pernicious constructs operate in precisely the same way as their biological counterparts. No one can say exactly why a computer virus is no less "alive" than a real virus. Certainly, once let loose in the computational ecosphere, viruses seem to have a life of their own, though not necessarily a salutary life. But who said that artificial life-forms will wind up serving their creators? M

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Steven Levy, a Macworld *columnist, is currently writing a book on artificial life.*

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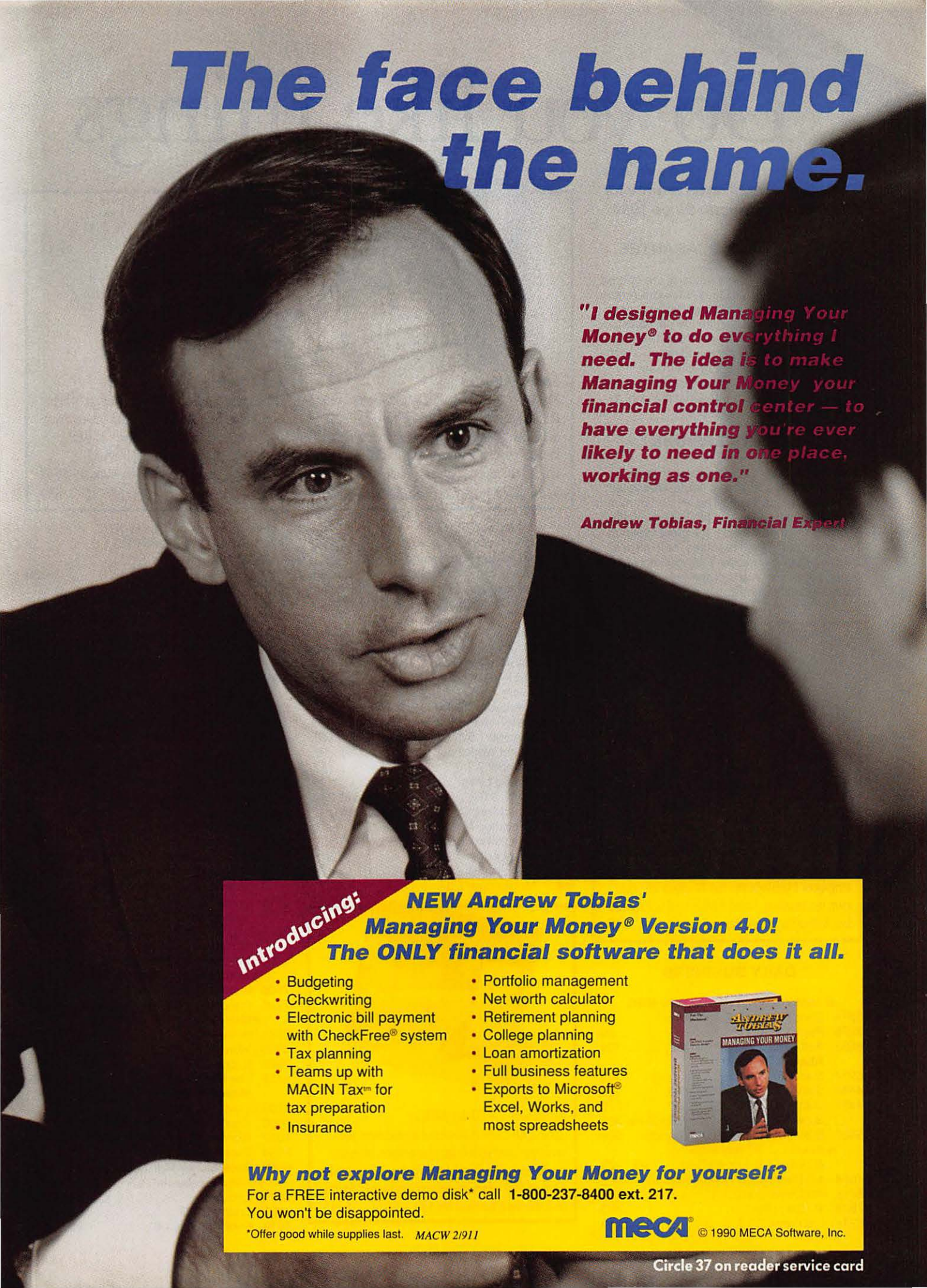
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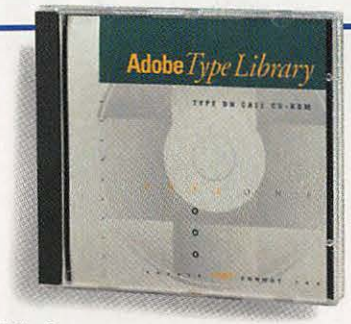
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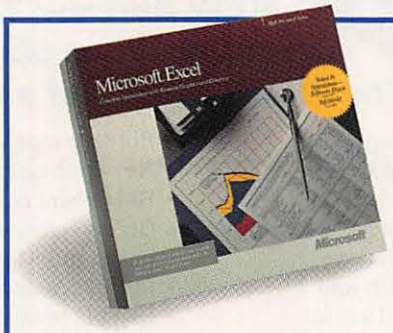
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★Mainstay ... 30 day MBG
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7715 MacSchedule 2.5 139.
8613 MacSchedule Plus 1.0 199.

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7506 Inside Information 1.0 68.
7820 Random House Encyclopedia 68.

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2884 Works 2.00C 184.
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5454 The Microsoft Office 525.

Microsoft Press
6703 Inside SuperCard Book 15.
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2864 Excel In Business Book 18.
6500 Excel Money Mgr. Book *(incl. disk)* . 25.

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5048 EndLink 1.1.3 58.
4602 EndNote 1.3 85.
8010 EndNote Plus 1.0 145.

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4228 For the Record 2.0 30.
2981 WillMaker 4.0 *(not valid in LA.)* 35.

★Odesta ... 30 day MBG

5621 Double Helix III 3.0R6 389.
6468 DataDesk 3.0 459.

Paragon Concepts

5683 Nisus 3.04 245.

★Portfolio Systems ... 30 day MBG

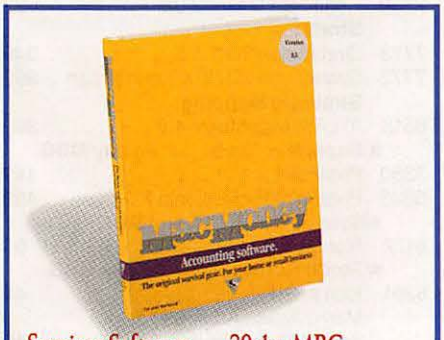
7992 DynoPage 1.0 72.
6916 Dynodex 2.0 72.

★PowerUp ... 30 day MBG

7696 Calendar Creator 1.0 35.
7697 Letter Writer Plus 52.
7694 Address Book Plus 2.0 57.
7698 Fast Forms 2.0 105.

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7482 RightWriter for the Mac 3.10 54.



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6929 WealthBuilder 1.0 $145.

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Satori Software

3320 BulkMailer 3.25 75.

★Sensible Software ... 30 day MBG

3375 Sensible Grammar 1.6 51.

★Shana ... 30 day MBG

8201 Informed AutoForm 1.0 75.
8810 Informed Manager 1.0 99.
7692 Informed Designer v. 1.0.4 159.

★Softstream Int'l. ... 30 day MBG

8175 HyperTax Tutor 1.0 59.

Softsync/BLOC

7129 Accountant, Inc. 2.0 339.

Softview

3470 MacInTax Personal Edition 1990 ... 59.
8611 if:X Business Expense Reports 1.0 . 48.
8612 if:X Personal Tax Analyst 1.0 48.
7499 if:X Forms Designer 1.0 169.

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★Survivor Software ... 30 day MBG

3289 MacMoney 3.5 59.

★Symantec ... 30 day MBG

3422 More 3.0 265.

★Symmetry ... 30 day MBG

6069 KeyPlan 1.0 239.

★Synergy ... 30 day MBG

6617 KaleidaGraph 2.1 145.

★SYSTAT, Inc. ... 30 day MBG

7410 SYSTAT 5.1 599.

★Teleware ... 30 day MBG

7616 M.Y.O.B. 2.05 142.

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8939 Timeslips III Accounting Link 1.0 ... 52.
2986 Timeslips III 2.0E 195.

★T/Maker ... 30 day MBG

3639 WriteNow 2.2A/Grammatik Mac .. 117.
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8206 SmartBundle *(WriteNow, Full Impact 1.1, SuperPaint 2.0 & RecordHolder Plus)* 215.

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3781 LaserWriter Label Pack *(Qty. 216)* .. 18.
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4976 StickyBusiness 1.4 51.

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8052 Cheshire 1.0 62.

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6957 Adobe Type Reunion 1.0 38.
5750 Adobe Type Manager 2.0 55.
8794 Adobe Type On Call CD/ATM 47.
6053 Adobe Plus Pack 109.
6156 Adobe Plus Pack/ATM 159.
6098 TypeAlign for ATM 1.0.4 59.
6985 Adobe ATM/TypeAlign Pack 89.
6671 Adobe Type Set 1 55.



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1330 *Aldus FreeHand 3.0*–Delivers unprecedented control over the entire design & illustration process. Features on-screen palettes, flicker free drawing, rapid screen redraw, WYSIWYG, view or print 32-bit TIFF images & easier to use $399.

6677 Adobe Type Set 2 55.
7587 Adobe Type Set 3 116.
8042 Adobe Type Sets 1-2-3 Bundle ... 199.
8171 Adobe Illustrator 3.0 *(w/ATM)* 349.
6644 Adobe Photoshop 1.07 499.
5001 StreamLine 2.0 119.
Smart Art I, II, III, or IV *ea.* 59.

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6674 Personal Press 1.0 199.
3506 SuperPaint 2.0A 135.
8811 SuperPaint/Personal Press Bundle 279.
3980 Digital Darkroom 2.0 259.
3507 Super3D 2.1 339.
4751 Aldus Persuasion 2.0 329.
7467 Aldus PrePrint 1.0 329.
1330 Aldus FreeHand 3.0 399.
7088 Aldus PageMaker 4.0 499.
8054 Aldus Design Team 869.



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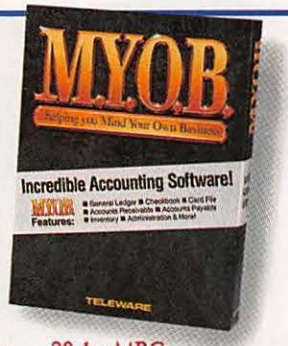
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6499 Metamorphosis 1.5 85.
1195 Fontographer 3.2 259.

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8878 FontMonger 1.0 63.

★Baseline Publishing ... 30 day MBG

8055 Screenshot 1.2 31.
8872 MasterPaint 1.0 51.
7784 Color MacCheese 1.05 57.
7828 Exposure Pro 1.1 69.

Bright Star Technology

6093 interFACE 1.0 249.

Broderbund Software

9351 Kid Pix 1.0 29.
1427 The Print Shop 1.3.2 35.
6281 TypeStyler 1.5.2 115.

★Casady & Greene ... 60 day MBG

8879 Fluent Font Library 4.0 99.

Claris

1123 MacPaint II 2.0 90.
1117 MacDraw II 1.1V2 285.
8007 Claris CAD 2.0 645.

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6095 DeltaGraph 1.5 109.

★Deneba Software ... 30 day MBG

6365 UltraPaint 1.01 125.
1769 Canvas 2.1.1 189.

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Cliptures: Business or Sports . . *ea.* 68.

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4315 Studio/8 2.0 189.
8056 Studio/32 1.0 449.

★Farallon Computing ... 30 day MBG

6770 MacRecorder Voice Digitizer 89.
2199 MacRecorder Sound System 2.02 159.

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6728 Comic Strip Factory 1.6 37.
9438 Comic Strip/People & Kid Bundle . . 71.

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7886 ENHANCE 1.2 235.

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7556 MapArt *(PICT)* 99.
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7441 Swivel 3D Professional 1.0 435.
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7839 FilmMaker 1.0 435.

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8966 MacRenderMan 549.

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7612 QuarkXPress 3.0 519.

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3446 The Curator 1.05 87.

★Springboard ... 30 day MBG

3530 Certificate Maker 2.02 22.

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8263 Art Clips 1 49.
8261 Art Clips 2 64.
8248 Font Share 2.2 129.

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6379 Accents & Borders I 65.

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7115 Publish It! *Easy* 2.0 145.

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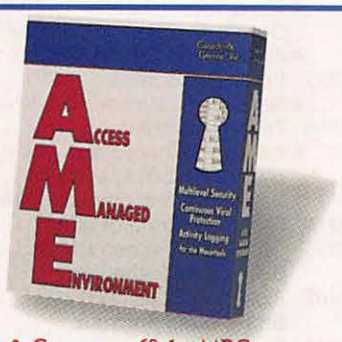
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6512 SnapJot 3.0 31.

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3986 DeskPaint & DeskDraw 3.03 113.

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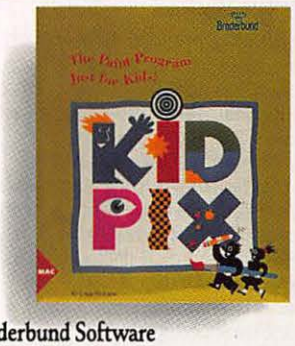
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5236 CanOpener 1.1 62.
★Advanced Software ... 30 day MBG
8051 In touch 1.0 40.
★Affinity Microsystems ... 60 day MBG
7835 Tempo II Plus 105.
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9439 MaccessCard/FileGuard *(1)* Bundle 399.
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7946 Remote *(10 Pack of inits)* 147.
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8286 SuperLaserSpool 2.02 93.
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4085 TMON 2.8.4 86.
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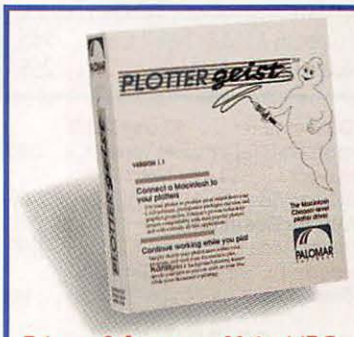
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6088 Smart Alarms 3.0 *(1-4 users)* 125.
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5457 QuickLock 2.0 34.
2591 The NightWatch 1.03 85.
6134 MacSafe II 107.
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★Loop Software ... 30 day MBG
5442 PictureBook 3.2 39.
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7267 AutoSave II 2.0 27.
7270 Backmatic 2.0 50.
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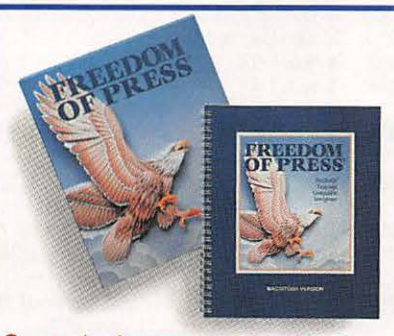
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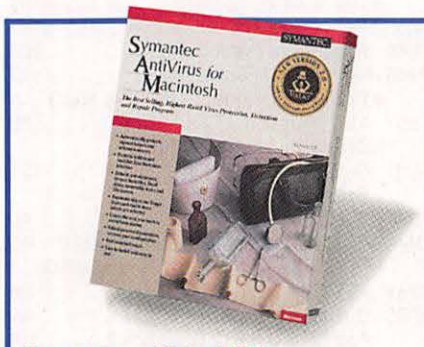


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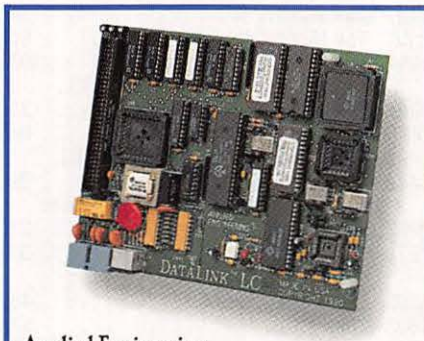


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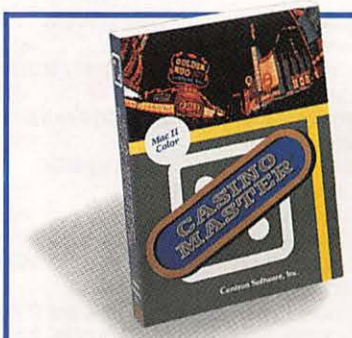
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8266 SimEarth 1.0. 40.
4966 SimCity 1.2 *(CP)* 29.
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5604 Finale 2.5 549.
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Pronunciation Tutor - Beginner *(Span., Fren.)* ea. 35. *(Germ., Chin.)* 39.
Verb Tutor - Intermediate *(Spanish, French, German)* . . . ea. 39.

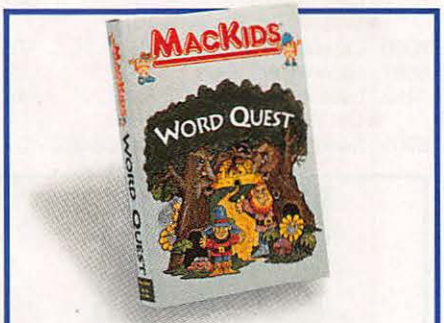
9349 Chinese Survival Manual 39.
9348 Chinese Writing Tutor 39.
6611 Kanjimaster - Beg. *(Japanese)* 99.
8026 Easy Kana 129.

Individual Software

7425 Training for Microsoft Word 4.0 35.
4990 Training for Aldus PageMaker 4.0 . . 35.

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5870 Bomber 1.3 *(includes headphones)* 32.
7622 Darwin's Dilemma 1.0. 32.
8809 Tesserae 1.0 32.



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★Microsoft ... 30 day MBG

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★Mysterium Tremendum ... 30 day MBG

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8258 Turbo Math Facts 1.1 26.
8260 Word Quest 1.0. 31.
8257 PreSchool Pack 1.0 36.

Passport Designs

8253 TRAX 2.0 59.
9442 AudioTRAX. 129.
8254 Desktop Music Creativity Kit 189.
3117 Master Tracks PRO 4 4.1.4. 319.
8250 Encore 1.3.1. 379.
8880 Alchemy. 439.

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Postcraft

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Strategic Conquest or NetTrek . ea. 34.

Sierra On-Line

3397 Leisure Suit Larry *(CP)* 23.

Sir-Tech Software

8228 Wizardry II: Knight of Diamonds *(CP)* 29.

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4588 Life & Death *(CP)* 32.

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8180 Faces 24.
3459 Falcon 2.2 32.

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8085 Panzer Battles. 26.

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★Toyogo ... 30 day MBG

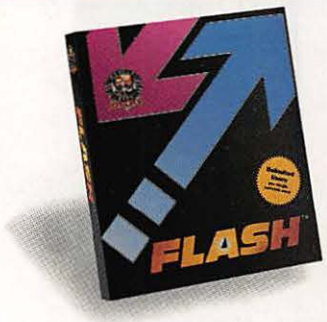
7836 Go Junior 19.
7624 Nemesis Go Master 4.7. 41.
7623 Nemesis Go Master Deluxe 4.7. . . . 85.

★Voyager ... 30 day MBG

Amanda Stories *(vol. 1, 2 or 3)* . ea. 18.

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8061 MacSki 1.01 39.
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8938 DataLink LC 265.
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7691 Flash 1.1. 125.

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1676 Macintosh Membership Kit 1.03 . . . 23.
1673 CompuServe Navigator 3.0 49.
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4842 *MacLink Plus/Translators 5.0 (Qty. 250)*. 109.

280C

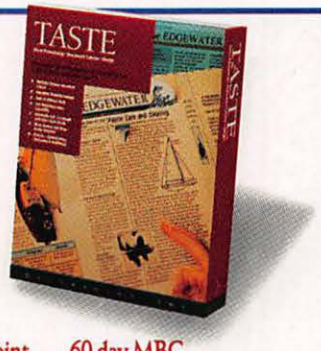
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4866 Timbuktu/Remote 2.0 123.
6371 Timbuktu/Remote Access Pack .. 845.
8707 Liaison 3.0 259.
6273 PhoneNET StarConnector 10-Pack. 129.
4869 PhoneNET Connector 10-Pk *(DIN-8)* 198.
2206 PhoneNET StarController 300 825.
6687 PhoneNET StarController-EN.... 1589.
6766 MediaTracks..... 189.
6768 MediaTracks Multimedia Pack.... 319.

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Hayes

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2307 Smartmodem 2400..... 349.
5991 V9600 Baud Modem 689.

Insignia Solutions

7557 Access PC 1.0 62.
7058 SoftPC-AT/EGA Module 125.
4089 SoftPC 1.3 245.

Intel Corporation

5119 2400EX Modem..... 179.
6420 2400EX MNP Modem..... 229.
8193 9600EX Modem *(w/QuickLink II)*.. 549.

International Business Software

8581 DataClub *(3 user)* 199. 8580 *(10 user)* 539.

★Kennect Tech. ... 30 day MBG

5631 Rapport 1.3.4..... 195.
7588 Drive 360 *(5¼")*..... 249.
7590 Drive 1200 *(5¼")*..... 249.
5632 Drive 2.4 *(3½") (incl. FastBack II)*. 325.

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8027 MacModem V.32 689.

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6272 NuvoLink SC 389.

★Orchid Technology ... 30 day MBG

6949 OrchidFAX Modem 1.06..... 429.

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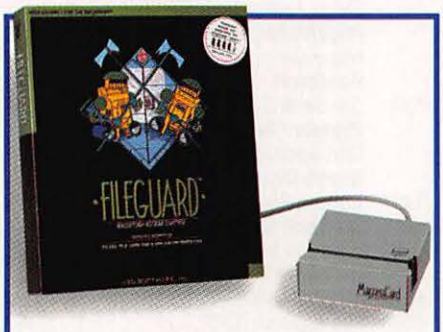
3102 2400 Baud External Modem..... 179.
8994 2400 V.42 bis Modem..... 209.
7934 PM9600SA Modem 1.26 489.
3089 Mac Communications Pack 225.

★Preferred Publishers ... 30 day MBG

8943 DoubleTalk *(1 Pak)* 79. 8942 *(2 Pak)* 129.

★Prometheus ... 30 day MBG

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8348 24/96 Minifax 189.
8762 Travel Modem..... 189.
8349 Maxfax..... 289.
8709 2400M Plus..... 219.
8738 9600M Plus 599.
8990 Ultima 9600 689.



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9440 *MaccessCard Reader (reqs. FileGuard)*.. 299.
9439 *MaccessCard/FileGuard (1) Bundle*..... 399.

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4347 NetBridge..... 409.
4942 TeleBridge 409.
3443 NetModem V2400 3.3 339.
6917 NetModem V.32 *(V.42 & V.42 bis)*. 1169.
6519 EtherGate 1619.
8189 FastPath IV 1889.

Sitka/TOPS

4188 TOPS Teleconnector *(DIN8)* 23.
3720 TOPS Flashcard 155.
6264 TOPS Networking Bundle 3.0 187.

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3455 MicroPhone II 3.0 215.

★Solutions, Inc. ... 60 day MBG

6720 FAXGATE Plus 1.1.2..... 239.

★Synergy ... 30 day MBG

6618 VersaTerm 4.5..... 87.
6619 VersaTerm-PRO 3.5..... 173.

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3729 LapLink Mac III Connectivity Pac .. 93.



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6686 UPS 370ci 339.

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8124 Typist 479.
4476 OmniPage 2.12..... 495.
6660 OmniSpell 1.0..... 69.
6658 OmniDraft 1.0..... 69.

Chinon

8814 DS-3000 Scanner w/Dig. Darkroom 699.
8815 DS-3000 Scanner w/OmniPage .. 1069.

Computer Friends

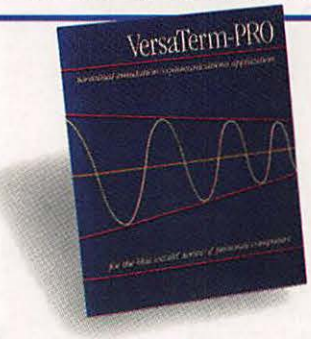
8271 ColorSnap 32+ 649.

★CoStar ... 30 day MBG

6090 LabelWriter..... 179.
6067 LabelWriter Labels 9.
7452 LabelWriter Labels *(12-Pak)*..... 49.

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Kathleen Tauson

Kathleen Tauson
Extraordinary Word Processing
Boston, MA

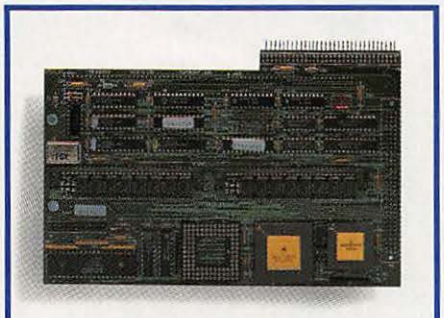
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1725 Mac SE Ext. Keyboard Cover set. . . 10.

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6763 SE Radiation/Anti-Glare Filter 52.
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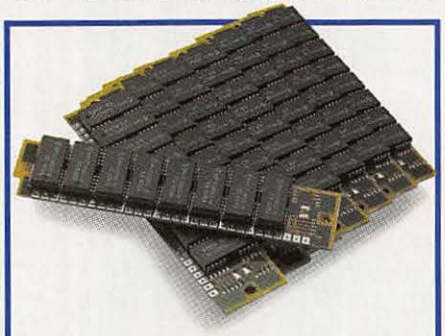
4623 Solid Oak Disk Case *(holds 90 disks)* 32.
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4014 High Trek Mac SE & Ext. Kybd. Case 69.

★Targus ... 60 day MBG

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3298 3½" HD Disks 1.44 Meg *(10)* 19.
6375 3½" HD Disks 3 Pak *(30)* 49.
8185 QD2040 Tape Cartridge 19.

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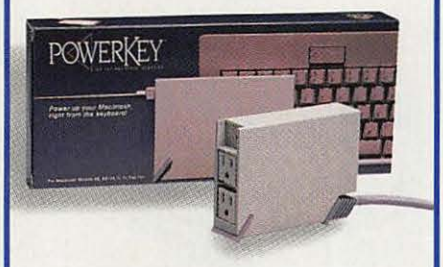
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GDT Softworks
6256 PrintLink Collection 4.0. 59.
6151 JetLink Express 2.0 89.
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Hewlett-Packard
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Kodak
6730 DICONIX M150 Plus Printer 399.
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6229 Grappler LX 134.
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7412 Pacific Page PE 4.0 for the Mac . . 529.
Passport Designs
3115 MIDI Interface. 85.
RasterOps
8526 Video Expander 529.
7469 ColorBoard 264 for SE/30. 679.
7457 Video ColorBoard 364 975.
8944 RasterOps 24STV 1299.
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6104 Half-Page Scanner/400 295.
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4994 LightningScan 400. 385.
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5736 45 Meg Removable Cartridge. 79.
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8649 MacSnap 596XE *(4 Mb)*. 299.
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Circle 24 on reader service card

Know Your Rights

A CONCISE GUIDE TO CONSUMER LAW

BY DEBORAH BRANSCUM

State deceptive-trade laws can be a powerful weapon against unfair business practices. California's Consumers Legal Remedies Act, for example, makes trade unlawful under certain situations, including when the sale of goods or services is said to be of a certain type or brand when they are another; when goods or services are advertised with the intent *not* to sell them as advertised; and when the affiliation, connection, association with, or certification by another is misrepresented.

As powerful as these state laws can be, they're not necessarily helpful to individuals whose complaints can't justify hiring an attorney. Still, state consumer agencies often use these laws to great effect.

Fair Credit Act

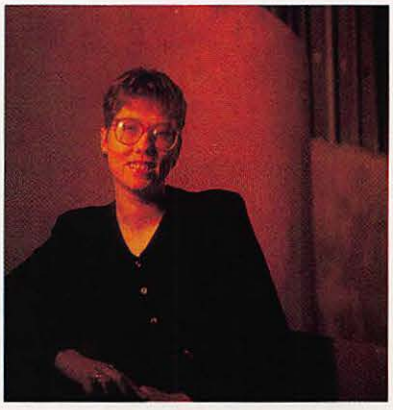
One of the most useful federal consumer protection laws is the Fair Credit Act, which allows consumers to dispute credit card charges if products they purchased are not satisfactory or never materialized. Consumers must make a good-faith effort to resolve any dispute. If that doesn't work, they need to inform the credit card company of the disputed charge within 60 days of its appearance on a credit card statement. (The 60 days begins when the statement is mailed, not when it is received.) If a company charges a credit card for a product that has not been delivered or was damaged and returned, the cardholder should dispute the charge even if the company promises delivery or replacement soon. Otherwise, he or she will lose all protection if the company reneges on its promise.

Once the credit card company, usually a bank, has been notified, it becomes responsible for investigating the dispute. Within 90 days of receiving notice, the bank must either credit your bill for the disputed amount or send a written explanation of why the company believes the bill to be correct. Until that happens, you're not required to pay the disputed amount or any interest on that charge, according to *Credit Card Secrets* by attorney Howard Strong (Boswell Corporation, 1989).

Mail-Order Rights

To protect yourself, use a credit card for any expensive purchases you make. Do not listen to companies that promise to expedite your order if you mail them a cashier's check, or companies that refuse to take credit cards—they may have cash-flow problems.

Mail-order customers have several rights under Federal Trade Commission regulations, various state laws, and U.S. Postal laws. The FTC's Mail Order Merchandise Rule says that a company must ship your order when promised—if you ordered by mail, not by telephone. If no specific date is promised, a product must be shipped no later than 30 days after you place the order. You have the right to cancel your order and get a prompt refund if your order isn't



shipped when promised or within the 30-day limit.

You should receive a so-called option notice if the seller cannot meet its delivery date. This notice shows the new shipping date and gives you the option of either canceling the order and getting a refund or agreeing to a new shipping date. If you cancel the order, the company is supposed to mail a refund promptly or credit your charge account within one billing cycle.

(There are some exceptions to the FTC rule, including photo processing, magazine subscriptions, seeds and plants, COD orders, and credit orders where the account is not charged until the product is shipped.)

Warranties

Generally speaking, there are three types of warranties. Most major purchases have written warranties, governed by the federal Magnuson-Moss Warranty Act, but these are not legally required. There are also express warranties and implied warranties. An express warranty is a written or oral

(continues)

WHERE TO TURN FOR HELP

The U.S. Office of Consumer Affairs (202/634-4140) in Washington, D.C., offers a referral service for consumers who are unsure where to take their complaints.

Other agencies that may be useful are the U.S. Postal Service, which investigates mail-order problems that may involve fraud or false advertising, and the Federal Trade Commission, which was founded in 1917 to keep business competition free and fair. The Postal Service has the authority to investigate both criminal cases of mail fraud and civil cases that involve misrepresentation in mail-order marketing. To file a complaint, write to the regional chief inspector in your area: Western Region, U.S. Postal Service, San Bruno, CA 94098-0100; Central Region, Main Post Office Bldg., #712, Chicago, IL 60607-5401; Eastern Region, One Bala Cynwyd Plaza, #E-300, Bala Cynwyd, PA 19004-9000; Northeast Division, 2 Gateway Plaza, 8th Fl., Newark, NJ 07175-0001; and Southern Region, 1407 Union Ave., 10th Fl., Memphis, TN 38161-0001.

The FTC guards against false and deceptive advertising, among other duties, but doesn't resolve individual complaints. Instead, the agency looks for patterns of problems with specific companies before it moves to action.

To find out how to file a complaint, call one of the FTC's regional offices in Los Angeles (213/575-7575), San Francisco (415/744-7920), Seattle (206/553-4655), Denver (303/844-2271), Dallas (214/767-5501), Chicago (312/353-4423), Cleveland (216/522-4207), Atlanta (404/347-4836), New York (212/264-1207), or Boston (617/565-7240). Some cities have local numbers for the regional offices; check the government pages of your telephone directory to see if your city has one.

There are two trade groups that offer free dispute-resolution services that affect computer users.

The Direct Marketing Association in New York has a program available to anyone with an unresolved mail-order problem. Consumers are asked to write with the details of the complaint, including the name and address of the company, the item or service ordered, and the date of the order. Photocopies of supporting documentation should be included and sent to Mail-Order Action Line, Direct Marketing Association, 6 E. 43rd St., New York, NY 10017-4646. The association works to resolve the problem within 30 days.

The Electronic Industries Association in Washington, D.C., also offers help through its Consumer Complaint Assistance Program. If an individual consumer is unable to resolve a dispute after contacting both the retailer and manufacturer involved, the association will review the complaint and, if warranted, will approach the manufacturer on the consumer's behalf. The association aims for resolving complaints within three weeks; the companies involved need not be members. Complaints involving computer hardware and peripherals should be mailed to Electronic Industries Association, 2001 Pennsylvania Ave., NW, Washington, DC 20006.

statement a company makes about a product's capabilities or features. If you decide to buy the product *as a result of the statements*, the statements "constitute an express warranty that you have a right to rely on. This is true even though the written warranty states there are no other warranties," writes attorney Ralph Warner in *Everybody's Guide to Small Claims Court* (Nolo Press, 1989).

(There's a difference between standard sales hyperbole, such as "this is the best database on the market," and an express warranty, such as "this database can search 1 million records in 60 seconds.")

For most new products there's also an implied warranty of merchantability, or fitness for use, that exists despite any written statement to the contrary. According to the FTC, "Implied warranties are created by state law and all states have them." Essentially, a seller promises that a pen will write, a car will run, and a hard drive will hold information.

Warner's book gives a good example of how different warranties work: Alan buys a computer and some expensive software from ABC Computer after explaining his accounting needs in detail. Two days later, it's clear that the program isn't sophisticated enough for Alan's complex accounting needs and that the salesperson was wrong when he said it was "ideally suited" for Alan's situation.

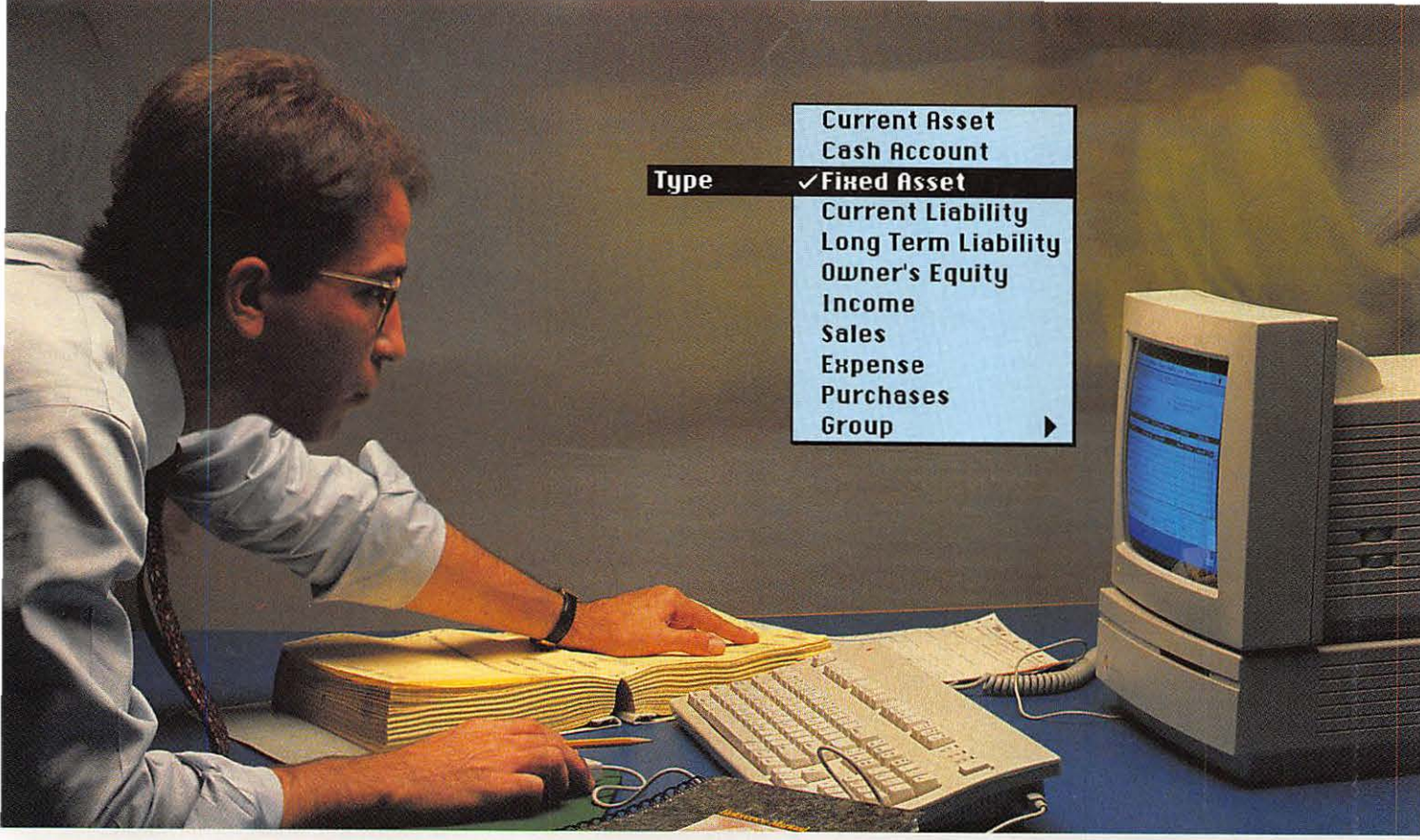
Although the software has no written warranty, "Alan can claim a breach of express warranty (the salesperson's statement that the software would meet his needs) and the implied warranty of general fitness or merchantability (it simply doesn't meet the reasonable standard of accounting packages)," writes Warner. "This latter claim would be hard to prove, however, if the software is adequate to accomplish more routine accounting tasks, just not sophisticated enough for Alan's special needs." The first claim—that the software breaches the express warranty—might also be difficult to prove if Alan has no witness to the salesperson's claims and nothing in writing. Before an important purchase, consider giving a salesperson a list of the specifications that must be met for a product to meet your needs, and keeping a copy of the list. Better yet, try to get the salesperson's promises in writing. Either way, if the product doesn't work for you but the dealer won't return your money, you'll have evidence for small-claims court.

Small-Claims Court

Most states have small-claims courts, which give people an affordable way to press their claims without resorting to an attorney. The procedure varies from state to state, and the amount of the claim is limited. In California and Texas the claim is limited to $2500; in New York the limit is $2000; in Massachusetts, $1500.

Generally, the procedure is simple. First you go to the small-

(continues)



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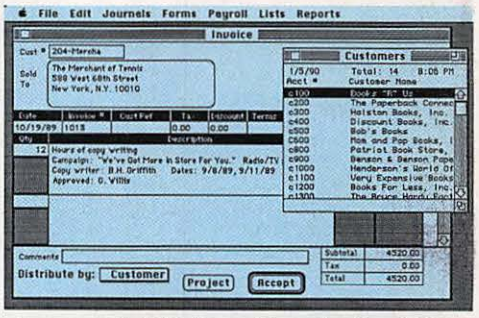
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Circle 367 on reader service card

WE DIDN'T THINK IT COULD HAPPEN TO US.

But why take a chance?
Sure, we'd heard about virus protection. But it was hard to believe our innocent little Mac could be a breeding ground for computer disease and disaster. Until we started sharing more data disks. And spending more time online. Suddenly it really made sense to protect ourselves.

So we decided to play it safe.
The last thing we wanted was some complex paranoid program that kept interrupting us while it went on search and destroy missions. We wanted a program we could load and pretty much forget about.

That's why we chose Rival. *It automatically* checks all our files as *they're opened* (even INITs). If it finds any viruses it fixes them on the spot. And we can get new vaccines free from our user group or electronic bulletin board (or by subscription for a small fee).

So when it comes to virus protection, take our advice. Don't get scared. Get Rival.

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"faster and easier to use . . ."
—MacWEEK, July 10, 1990

". . . has replaced SAM as my preventer and checker of choice."
—MacUser, September 1990 (5 Mice)



Circle 228 on reader service card.

SERVICE HERO

Lorie J. Call of Santa Clara, California, writes in praise of Global Village Communications. After buying a TelePort modem, Call realized it would not work with her Mac IIsi, which has only one ADB port. She called Global Village tech support, which told her the company was retrofitting TelePorts with ADB Y-jacks at no charge. "They received it Thursday around lunchtime. By Saturday afternoon, I had my modem back, complete with ADB Y-jack!"

claims court clerk for a plaintiff's statement form, which you fill out and the clerk files for a fee ($8 in California; $20 in New York). The clerk assigns a case number and fills out another official form, which you sign. Then you arrange a court date with the clerk, make sure the defendants are served with papers, and show up for court. (In California, each county must provide a program of free advice to litigants; your local consumer agency should be able to offer advice if you decide to go this route.)

More Advice

For best results in winning a dispute, keep written copies of all your complaints, keep comments short and polite, and be persistent. The January 1990 *Conspicuous Consumer* offers more details on complaining effectively; "Where to Turn for Help" has a list of trade associations with consumer services and helpful agencies. Once armed with the facts, don't get mad—get a refund. M

(Research assistance by Carolyn Bickford.)

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Send nominees for sainthood to Service Heroes, Macworld, *501 Second St., San Francisco, CA 94107 or via AppleLink (Macworld1). Conversely, drop* Conspicuous Consumer *a line if a company is ignoring you.*

Survival of the fittest.

Which color scanner is the natural selection?



Microtek Scan Original: 8 x 10 B&W print
Brightness level: default Input resolution: 150 dpi
File Size: 525K Output Resolution: 300 dpi
Line Screen: 133 lpi Gamma Correction: None

When it comes to selecting the right scanner, be forewarned. It's a jungle out there. You may not get the quality you were promised.

The La Cie Silverscanner has evolved beyond all that. Just look at this comparison between the Microtek 300ZS and the La Cie Silverscanner. Each image was scanned at default settings with no corrections. This **entire** ad was then created and separated using Adobe Photoshop, QuarkXPress 3.0 and a Linotronic 330.

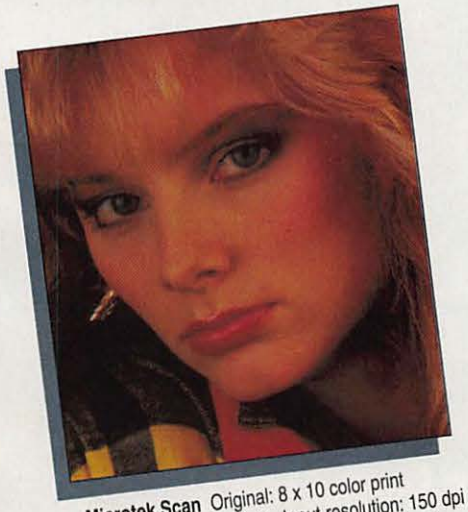
As you can see, Silverscanner is a more advanced species of scanner which provides superior color, gray scale and line art over other similar scanners. La Cie gives you more with OCR compatability, fast color previews, versatile scanning controls, and up to 1200 dpi.

As a bonus, Silverscanner comes with Adobe Photoshop LE*, Aldus PrePrint and La Cie's exclusive plug-in scanning modules for Photoshop, ColorStudio, Image Studio, and Digital Darkroom.

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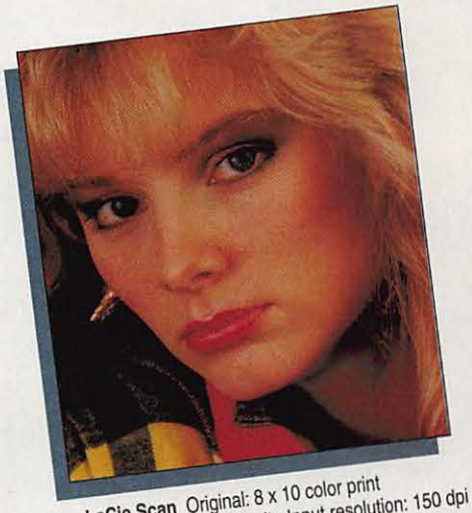
LaCie Scan Original: 8 x 10 B&W print
Brightness level: default Input resolution: 150 dpi
File Size: 510K Output Resolution: 300 dpi
Line Screen: 133 lpi Gamma Correction: None



Microtek Scan Original: 8 x 10 color print
Brightness level: default Input resolution: 150 dpi
File Size: 1,540K Output Resolution: 300 dpi
Line Screen: 160 lpi Color Correction: None



La Cie Silverscanner: 16 million beautiful colors, 256 smooth shades of gray, incredible line art, up to 1200 dpi all in a single pass.



LaCie Scan Original: 8 x 10 color print
Brightness level: default Input resolution: 150 dpi
File Size: 1,555K Output Resolution: 300 dpi
Line Screen: 160 lpi Color Correction: None

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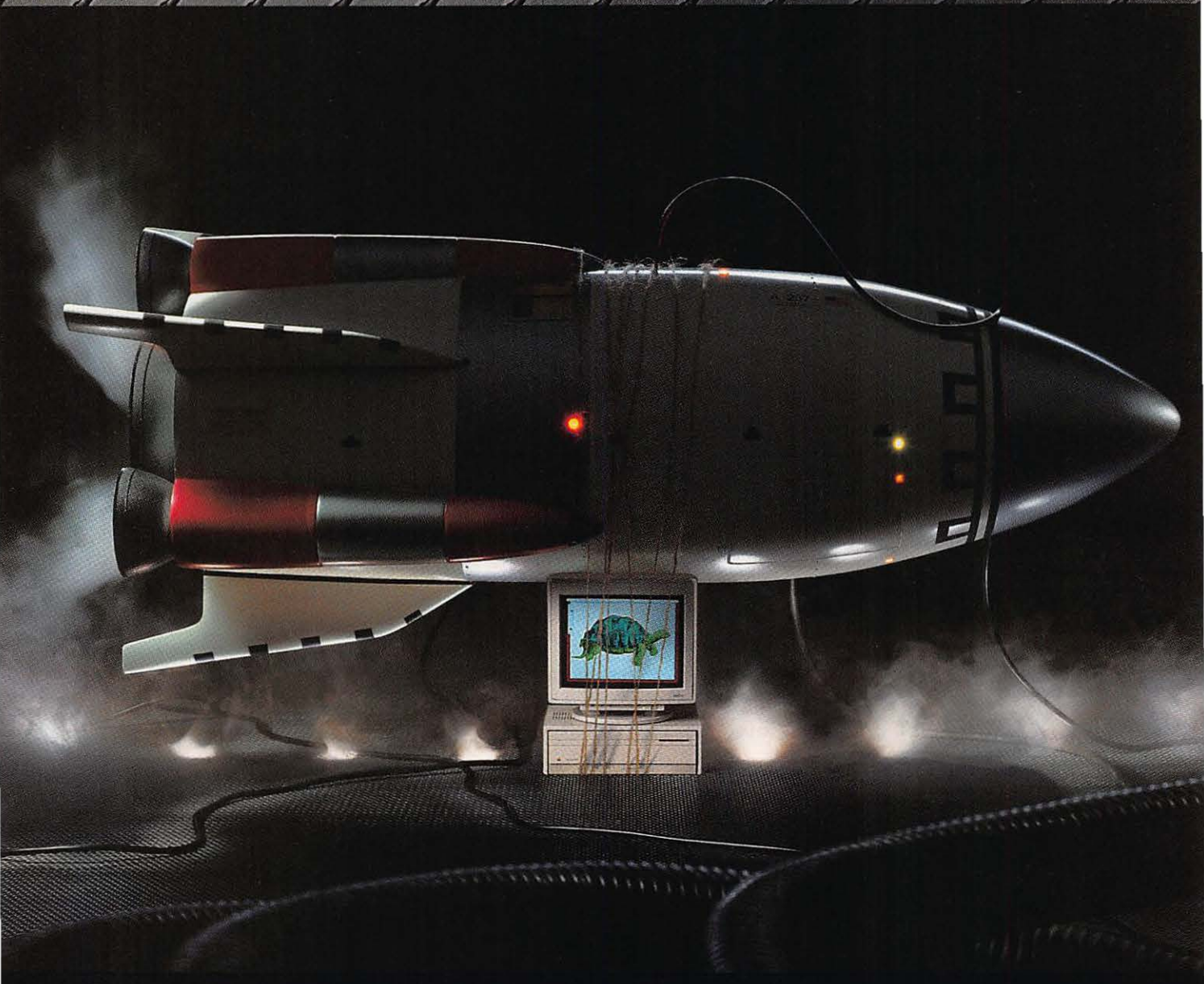
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Circle 40 on reader service card

Of the Mac's True Advantage and Other Musings

OUR INTREPID AUTHOR, HAVING WRIT, MOVES ON

BY BRUCE F. WEBSTER

This is my last column. Demands at work have been steadily increasing over the past few months, to the point that I can no longer do this forum justice. So I am reluctantly stepping down. But before I surrender the soapbox forever, I'd like to make a few last observations, not to mention taking the odd potshot at Apple. Here, then, as I see it, is the state of the Macintosh—and Apple.



I'm Looking through You

Apple's greatest competitive advantage probably lies with the display technology surrounding the Macintosh, especially that developed by third-party companies. The basic Mac concepts—bitmapped displays, a 1:1 screen aspect ratio, screen display that equals hard copy in size, and a virtual desktop extending across or beyond monitors—form a foundation imitated (but seldom equaled) by most other platforms. Twenty-four-bit color, graphics acceleration, video integration and editing, image-manipulation software, and large-screen displays enhance the competitive advantage. Image compression has gone from a nice idea to real hardware in a matter of months. The only systems offering serious competition to Mac display quality and options are the various Next platforms, and they still have a long way to go before they can offer the range of alternatives available for the Mac.

The Macintosh advantage, however, is largely unknown outside of the Mac market. Apple does little to promote these points in its general advertising and literature. Perhaps Apple's upper-management types are so used to this technology that they don't realize the value of what they have; perhaps they should spend a few weeks working with all the display options (such as they are) for competing systems. (While they're at it, they can ask the engineers to implement block transfers between main memory and the NuBus slots, removing the major roadblock to graphics performance on the Mac.)

Yes, Virginia, There Is a Low-End Market

The Mac Classic was the surprise hit of the Christmas season, with demand outstripping supply. And according to Apple, over 50 percent of the Classic buyers are first-time Macintosh owners. That's a tremendous success for a new machine, and it vindicates the calls for a low-cost Mac that have been around as long as the Macintosh itself. In fact, the supply crunch makes one wonder how much faith Apple management itself had in the sales potential of the Classic, since it so obviously underestimated the demand.

It's ironic that Apple's position should be strengthened by a machine that has no significant performance advantage over the original Macintosh released seven years ago. It's as though IBM were to have a big success with an MS-DOS system based on a 4.77MHz 8086 CPU. It makes you wonder what might have happened if Apple had released such a system two or three years ago. But that's water under the bridge, and I congratulate Apple on the success the company has achieved with the Mac Classic.

The jury is still out on the Macintosh LC. However, the combination of color, functionality, and Apple IIe compatibility makes the LC an ideal home Macintosh. And while it's not as cheap as the Classic, it's still within striking distance of a lot of budgets.

Power to the People

The Macintosh IIsi, on the other hand, is off to a rocky start. Complaints about the power supply have already surfaced; apparently the machine's not capable of handling some third-party NuBus boards. (What is it with Apple and power supplies? Has anyone at

(continues)

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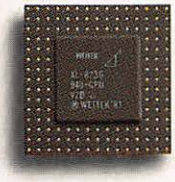
The EPL-7500 handles paper as well as it handles text and graphics. A 250-sheet tray comes standard, a second is optional. Also standard are AppleTalk,® parallel and serial interfaces, allowing the printer to work easily in both Macintosh® and PC environments.

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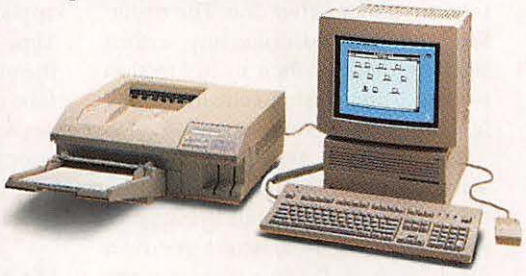
But rather than take our word for it, compare for yourself. Chances are, you will come to the same conclusion.

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Apple considered spending a few extra bucks and putting in a better-than-required power unit? And why does the company always stonewall when things go wrong?) Some have wondered if the IIsi's price is too high, given the limited expandability and lack of a standard floating-point unit (which costs $200 extra).

Personally, I can't see spending $5000 for a Mac IIsi system (20MHz 68030/68882, 2MB RAM, 40MB hard drive, 640 by 480 color monitor), when for the same price I can buy a Next-station (25MHz 68040/56001, 8MB RAM, 105MB hard drive, 1132 by 820 gray-scale monitor, Ethernet, bundled software, and so on). If I needed a Mac, I'd spend the extra bucks and get a Mac IIci—or, better yet, get a used Mac IIcx.

Speaking of which, I *still* think that killing off the Mac IIcx was one of the stupidest moves Apple has made in the history of the Macintosh product line. The IIcx was simple, clean, reliable, and well designed—more than can be said for some of the current Mac models, which are a bit too clever for their own good. If Apple is really serious about challenging the PC stranglehold on the corporate market, the company should resurrect the IIcx and put the basic box—4MB of RAM and an 80MB hard drive, no built-in display, no monitor, no keyboard—out on the market for $2495. A 1MB, no-hard-drive version should be available for $1795, letting dealers configure it with third-party products, just as they do with the PC clones.

At those prices, Apple's margin should be at least the same as for the Mac Classic, if not greater. And, unlike the Classic, LC, or even IIsi, the Mac IIcx would (and did) create a tremendous aftermarket for Apple and third-party hardware developers. More important for Apple's customers, the Mac IIcx isn't the dead end that the Mac Classic is. Face it: the Classic is a modern version of a seven-year-old computer, with too small a screen, too slow a CPU, no floating-point processor, and no significant expansion capability. The Mac IIcx can at least do a decent job of running System 7.0, handling number-intensive tasks, and supporting large-screen, 24-bit displays.

In short, I think the Classic will continue to do well, but I suspect it will mostly go into homes, schools, and small businesses. I can't see heavy corporate purchases of Classics; the systems are just too limited and will be quickly outdated. On the other hand, a renascent Mac IIcx, aggressively priced, could make serious inroads into corporate America. I think the IIcx would do better in the long run, but that's up to Apple to decide.

The Power of Balance

A year of doing this column has led me to believe that the Macintosh is one of the best-kept secrets in the personal computer marketplace. I've spent the last week watching my office companion, Deirdre, attempt to network three PCs and get a send/receive fax board working in the network server. The process has been anything but transparent. There have been conflicts between windowing and networking software, between fax hardware and the server's logic board, and between networking and fax software and hardware. There are two different windowing systems on the PCs (Windows 3.0 and PC/GEOS), but there are few applications available that run under either one. The result: We tend to avoid doing any serious work on the PCs; their main function to date is for playing solitaire during lunch or long recompilations.

By contrast, Mac hardware and software, including that provided by third-party vendors, tends to integrate well. You plug in a board and/or a cable, drop an INIT or cdev into the System Folder, restart, and that's usually it. You hook up two monitors—one monochrome, the other, 24-bit color—and find you can stretch a window across the two displays. There are the occasional exceptions, where problems of one kind or another arise, but those are just that—exceptions.

On top of that, the Macintosh is probably the most well rounded computer system around. Pick any given aspect of a system—display, sound, user interface, applications, networking, mass storage, performance—and you'll find the Macintosh either competes or excels in that area. And though there may be a superior solution on another platform for any particular aspect, you won't find another system that comes close to the Mac's overall balance and ease of integration.

Does Apple promote these strengths in its advertising? For the most part, no. Frankly, Apple's advertising—especially in print—has been in decline for the past few years, although some of the TV commercials show a bit of the old flash. Even so, the sum total of Apple's head-to-head competition can be summed up as, "People like to use Macintoshes more than PCs." That's nice, and largely true, but it's hardly a compelling reason for a corporate manager to risk her (or his) job, abandon the de facto PC standard, and install Macs.

A better (and still accurate) theme would be: "People spend less time and money installing, configuring, learning to use, and supporting Mac-based systems than PCs." Apple might use a Macintosh Challenge theme: randomly selected individuals attempt to perform the same tasks on both a Mac and a PC. Those tasks could include installing and configuring the operating system/user interface, setting up a network, hooking up two (or more) monitors to a single system, or cutting and pasting elements from various applications into a single document. Time-lapse photography could show the actual work; the individuals could talk about it afterwards. In short, Apple should promote the Mac's real strengths (balance, integration, ease of use), rather than its hoped-for qualities (popularity, low cost).

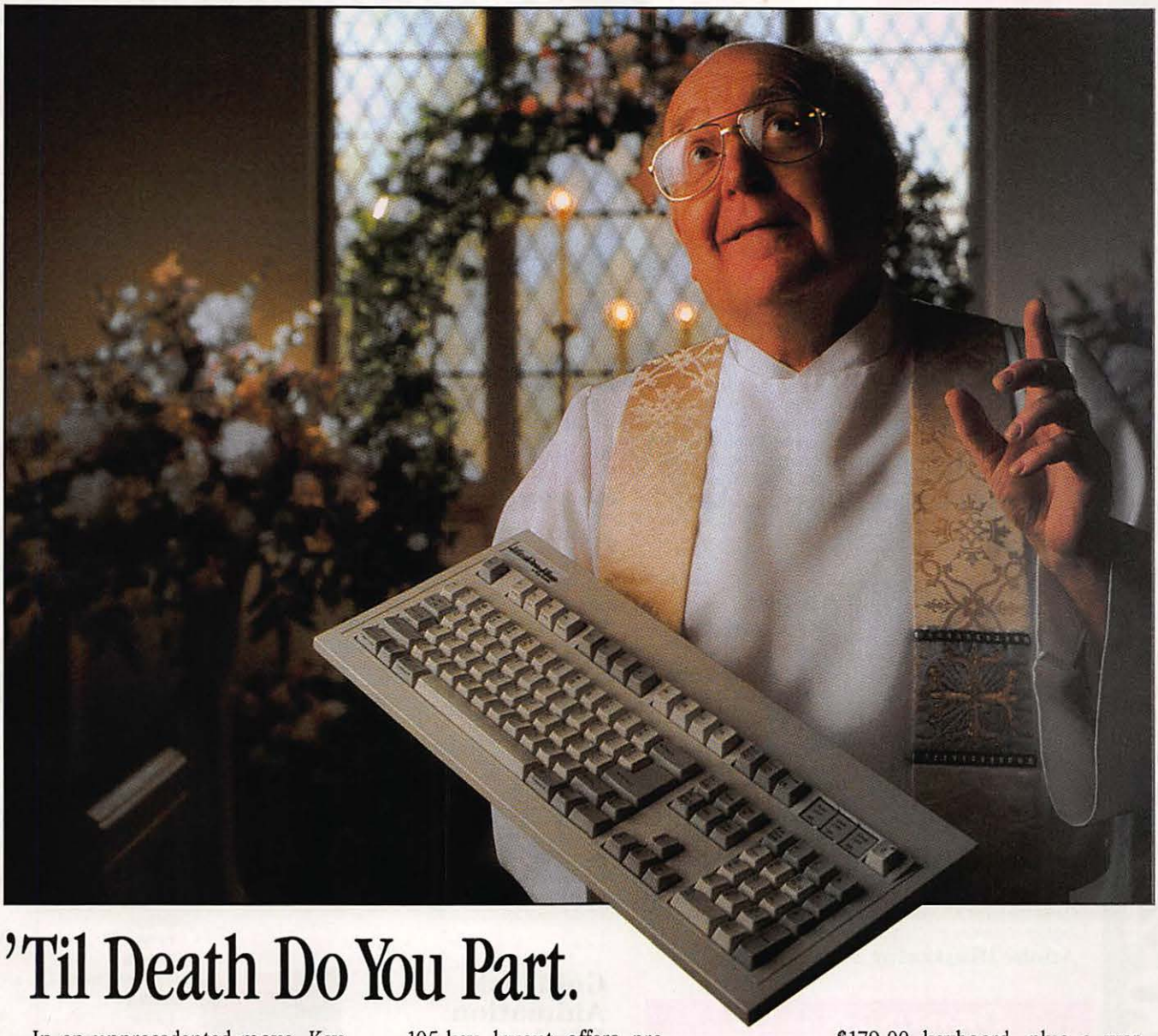
Life below the Thermocline

In large bodies of water, temperature-based layers can form. For example, a warm layer of surface water often rests atop a much colder layer, each with its own circulation pattern. The boundary between two such layers is called a *thermocline*, and it's very real, if invisible, with the temperature dropping several degrees in the space of a few feet. There is relatively little mixing between the layers, except for debris, fish droppings, and dead (or dying) creatures drifting down from above. Even nonmicroscopic creatures tend to stay in one layer or the other.

This image comes to mind because of the experience I had work-

(continues)

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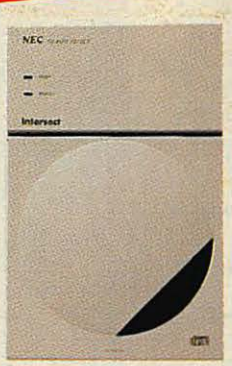
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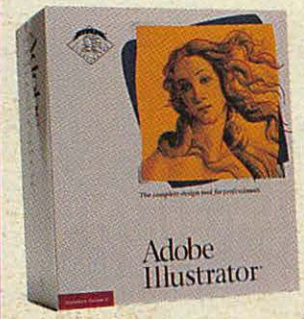
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Adobe Illustrator 3.0

Adobe Illustrator 3.0 is the premier product for single page design on the Macintosh. Adobe Illustrator 3.0 offers the highest quality design and illustration capabilities and now includes a powerful new text handling tool allowing for direct, on-screen entering and manipulation of text. Users can create and edit charts and graphs with ease while using new interactive dialog boxes for faster access to features. If this is not enough, every copy of Abode Illustrator 3.0 comes with Adobe Type Manager. Voted Product of the Year in InfoWorld.

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Timeworks
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Ventura Publisher for Mac . 584.

Zedcor, Inc.
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Claris
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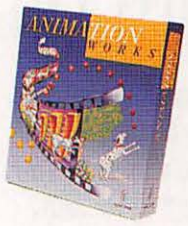
Generic Software
Generic Cadd Macintosh ... 374.

Graphsoft
Blueprint 2.0 218.
MiniCad Plus 3.0 594.

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Dreams 348.
MacDraft 2.1 278.

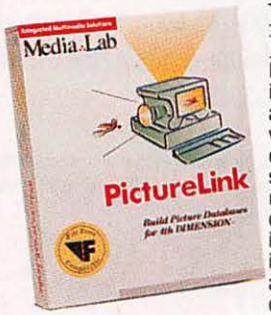
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Gold Disk Animation Works



Animation Works is a 1 to 8 bit, easy-to-use, path-based animation program. Objects are created in the CEL editor and then animated over static or scrolling backgrounds in the Movie Editor. Also available is the ability to add sounds, color cycling, multiple palettes, and looping control.

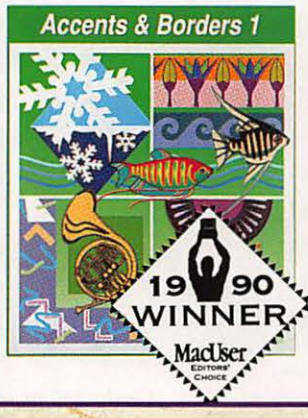
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PictureLink imports real-world full-color images (photos, artwork, 3D objects, anything!) into your database using a variety of methods. Scan into PictureLink directly from black and white or color scanners. Even grab real-world images in real-time from video sources such as cable TV, video camera, or other instruments. Use PictureLink to catalog images and data together for database applications where identification, documentation, and cataloging are essential. PictureLink "plugs into" 4th DIMENSION, resulting in seamless integration of real-world pictures within the database environment and greatly reduces the time required for importing and editing images into database records.

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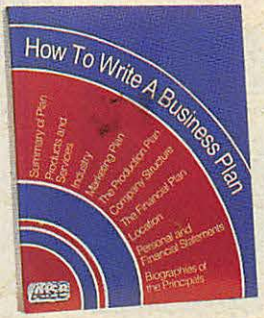


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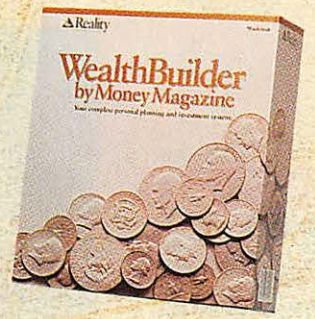
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How to Write a Business Plan $85

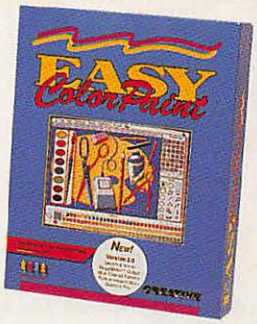
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Calculate your net worth by using templates to create a personal profile balance sheet and budget summary. If you use Quicken, Andrew Tobias, Manage Your Money or Mac Money you can import data directly. Establish realistic financial goals, objectives and then take action!

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Creative Software Easy Color Paint 2.0



Easy Color Paint 2.0 will bring many colorful and fun-filled hours to your Macintosh LC or any Macintosh II. It's suitable for all levels of users: window locking for beginners, fancy menu options and a pressure-sensitive pen for pros. Print your masterpiece in color to the ImageWriter II or any Color QuickDraw printer. No wonder it's a Finalist for "Best Personal Creativity Program' in this year's Software Publishers awards. See for yourself what all the excitement is about.

Easy Color Paint 2.0 $44

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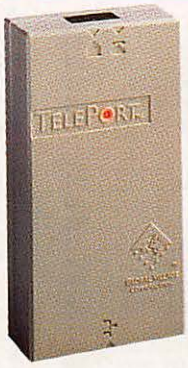
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GEOvista $169



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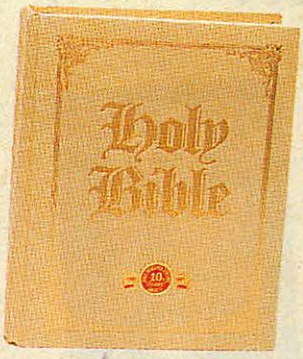
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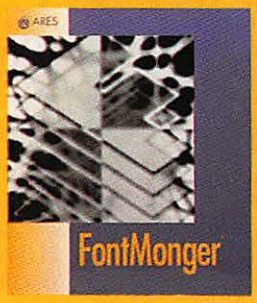
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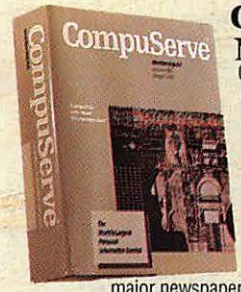
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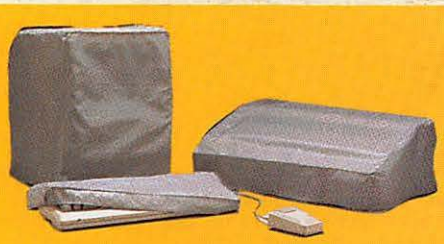


CompuServe Membership Kit

CompuServe is the largest on-line service, with over 500,000 users. Services include electronic mail, bulletin boards, special interest groups (Forums), and a discount department store. You can chat with other users in the CB mode, or check out the latest rumors in the gossip column. Databases include the complete text from major newspapers and encyclopedias, plus stock data weather forecasts and book and movie reviews.

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Mac 86 Card SE 385.
Orange Micro 386 1,695.

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030 25Mhz 995.
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OrangeMicro Orange 386

The 386 is truly a second computer functioning independently inside your Macintosh. The dedicated 16 Mhz Intel 80386sx processor and 1 Mb of on-board RAM (expandable to 16Mb) assures that your 1 Mb programs execute with maximum compatibility. We loaded the Orange 386 with innovative features, including two PC/AT bus slots which allow you to add AM PC cards inside your Macintosh. This capability opens the broad range of PC cards for the Mac.

Orange 386 $1695

American Power Conversion UPS 110SE and UPS 370ci



The power to protect your Mac. APC's UPS110SE and UPS370ci not only to provide better line filtering and surge supression than most surge suppressors, but they also deliver backup power during ACX line failures — giving you enough time to perform a safe shutdown. The UPS 110SE is sized for (and slides right under) a SE, SE/30 or Classics. The UPS370ci fits under your Mac II monitor and is sized to power a Mac ci or fx with a two-page monochrome monitor. APC also offers a complete line of more powerful UPS systems and PowerChute, a UPS monitoring program for AppleShare networks.

UPS 370ci $418
UPS 110SE $208

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DoveFax Plus offers the most sought-after fax software features such as full background operation when sending or receiving a fax (with or without MultiFinder); automatic answer, which allows you to receive a fax without interruption; redialing, which guarantees fast delivery; pre-scheduled transmissions, that allows you to send multiple faxes after hours when rates are lower; customized cover sheets and more! With the DoveFax Plus, your Mac turns into a personal voice messaging system, as well as a full-featured fax machine. The DoveFax Desktop can be upgraded to the DoveFax Plus with the simple addition of a microphone and software.

DoveFax Plus $395

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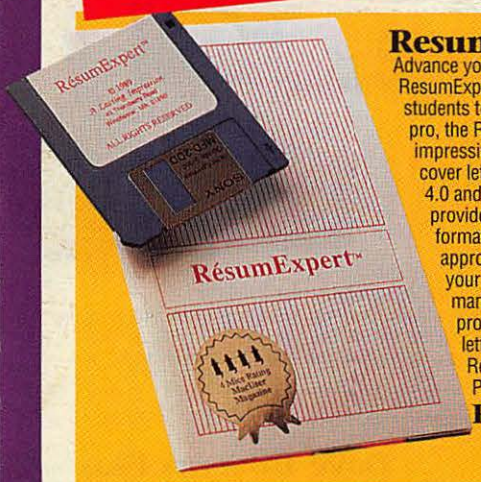
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Practica Musica 2.2 teaches you how to identify by ear two types of musical sounds, intervals, and chords. Version 2.2 now offers training for seventh chords and their inversion, plus advanced lessons in ninth, eleventh, and thirteenth chords. It also teaches the elements of music theory related to intervals and chords. Your Mac serves as the ever-patient drill instructor. It plans either through the Mac's sound chip, or any MIDI synthesizer. Includes Windows on Music, a coordinated music fundamentals toolbox.

Practica Musica 2.02 $68

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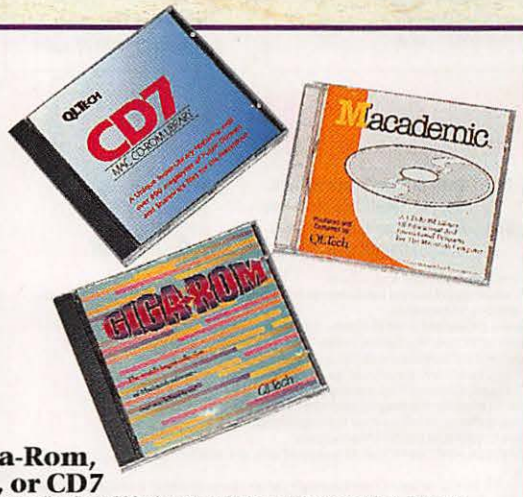
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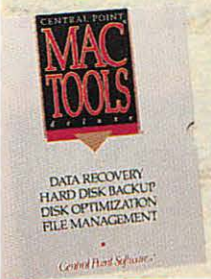


QLTech Giga-Rom, Macademic, or CD7

Giga-ROM is the largest collection of Macintosh software ever assembled. Files are archived in Bill Goodman's "Compactor" format and indexed with On Location. Macademic is 7,500 programs and related files for Education and Instructional use. Subjects range from the arts to the sciences. CD7 is The largest non-compressed collection of Macintosh software. Over 15,800 files including art, games, demo, and music files with digitized sounds.

Giga-Rom $98
Macademic $73
CD7 $49

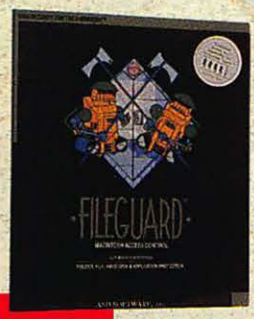
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Central Point Software Mac Tools Deluxe

Mac Tools provides utilities for data recovery, file protection, and disk management. You can make backups of your hard disk whether on Apple tape drive or a set of floppies. Other utilities in the collection undelete accidentally-erased files, recover damaged files, compress files, defragment files, and encrypt them. A DA finds "lost" files fast.

Mac Tools Deluxe $78



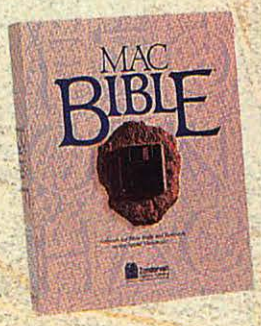
ASD Software FileGuard

FileGuard 2.5 protects your hard disk from unauthorized access. With it, you can limit access privileges to specific folders (including the system Folder), to particular users or work groups, and create "drop folders". FileGuard prevents others from copying or erasing the contents of your hard disk and offers password protection for your applications.

FileGuard $138

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macBible $58



Timeslips III 2.0

Timeslips III for the Mac is the ultimate time tracking and billing software system. With it you'll find that your workday is being spent more productively, and that your billings are much more complete. The features and functions are so simple, they practically run themselves.

Timeslips III ... $194

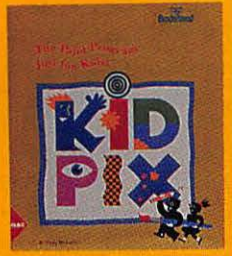
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Brøderbund Kid Pix



Kid Pix is an amazing paint program created just for kids. It combines special effect art tools, picture stamps, sounds and magic screen transformations to turn the computer into a magical art studio. And with Kid Pix, you don't just paint a masterpiece, you hear it too! Every brush and tool has its own unique sound effect. You can even record greetings, poems or music to enhance your creations

Kid Pix $31

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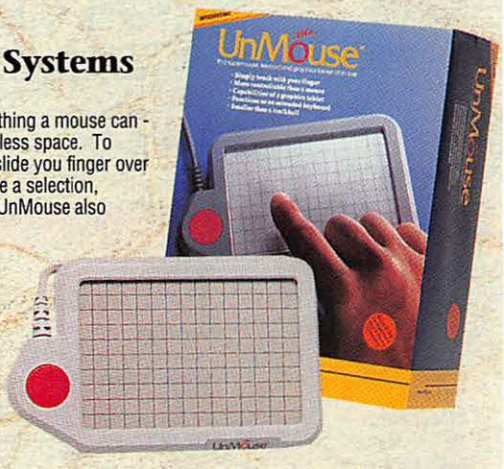
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Paracomp FilmMaker

The Eddy Award winning FilmMaker is the masterful animation and multimedia graphics program. This amazing application allows the user to create professional quality presentations and animations quickly and easily! What takes hours to create in other applications can now be done in just minutes with FilmMaker. Whether you're a professional animator who wants to create stunning effects for video, or just someone who wants to put their ideas in motion FilmMaker is the ultimate answer.

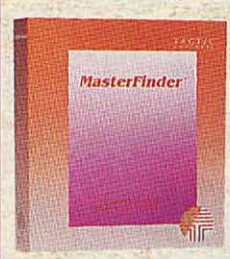
FilmMaker $438



Microtouch Systems UnMouse

The UnMouse does everything a mouse can - only faster, easier, and in less space. To move the cursor, simply slide you finger over the glass surface:; to make a selection, merely press down. The UnMouse also serves as an extended keyboard. Tap the large red button and you instantly have a Power Keypad with 16 keys available to execute macros (60 in advanced mode). With its one million touch points the UnMouse also performs admirably as a graphics tablet.

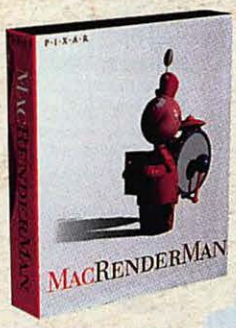
UnMouse $180



Tactic Software MasterFinder

MasterFinder is the complete disk management utility. MasterFinder allows for the complete control and manipulation of files and folders on any hard drive or floppy disk. MasterFinder is a total replacement for the Mac Finder. Using a concept of window panes as its basic user interface, each pane displays file names from a directory of a mounted drive. MasterFinder's start-up view, the "Pane" View, consists of four panes that can display information on all mounted drives.

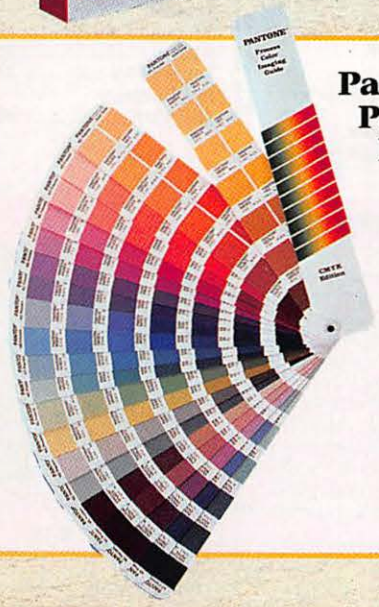
MasterFinder $49



Pixar MacRenderMan

Honorable Mention - 1990 MacUser Editor's Choice Award for Best 3-D Modeling/Rendering Package. Combine any 3-D program to create photographic-quality images with most advanced rendering software.

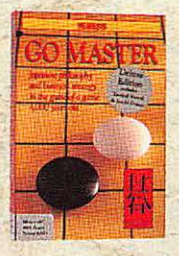
MacRenderMan $630



Pantone, Inc. Pantone Process Color Imaging Guide

The PANTONE Process Color Imaging Guide is the perfect companion to all Pantone-licensed software programs. It provides a visual comparison of soild PANTONE Color and process simulations as thay would appear on the final printed piece. As many PANTONE Colors cannot be satisfactorily reproduced in four-color process, this publication provides the user with the information to best decide whether to specify spot of process color while working on the desktop.

Pantone Imaging Guide $48



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Nemesis GO MASTER $94

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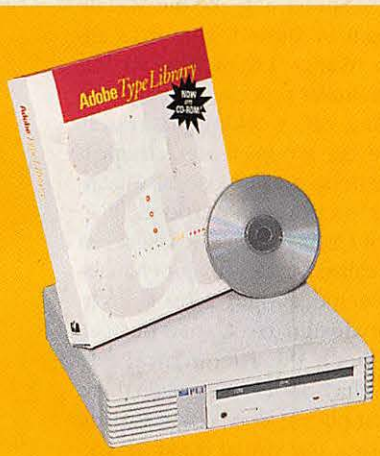


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ing at Apple a few years ago. I was there as a contractor to a third-party consulting firm, brought in for a couple of months to assist a small (three-person) team that was modifying a licensed commercial product for use in some dealer-demonstration and guided-tour disks. The exposure to Apple's innards was indeed enlightening, though not at all encouraging. I did very much enjoy working with the team. We managed to get everything done in time, I acquitted myself well, and when the contract ended, I was asked to consider a full-time position at Apple. I turned it down without a second thought.

That was no reflection on the people there; on the contrary, I found the majority of the people I came in contact with to be bright, talented, and committed. But the image of the thermocline came to mind again and again. There was upper Apple management, basking in the sun; the great mass of Apple employees below; and between the two, a constantly shifting layer of middle managers whose function appeared to be to keep the two groups from mixing. Stuff came drifting down from above, but little seemed to make its way up from below. Not only did reporting assignments constantly change, but so did cubicle assignments, often on very short notice. One Monday morning, I arrived at what I thought were the team's cubicles to discover an entirely different group of people in them, looking as though they had been occupying them for months. The sense of disorientation was unnerving; I felt as though I had dropped into some alternate universe. It turned out that the team had relocated over the weekend, though it took me the better part of an hour to find where they had relocated to.

Employee reaction to this whole environment ranged from good-natured humor to cynicism to a sense of betrayal and bitterness. It was obvious that many of these people really did want to change the world; they found that mostly they changed managers, departments, and cubicles. And while I can't claim that what I saw was reflective of the entire Apple organization, either then or now, it does give a clue as to why Apple, with all its resources, has been less than effective in bringing significant, reliable technology to the world for the past few years.

Is Small Beautiful?

One last thought to ponder: Is the size of those resources, the sheer number of Apple employees, a liability more than an asset? In the August 1984 issue of *BYTE* magazine, there was an interview with three of the original Macintosh project designers—Jef Raskin, Brian Howard, and Bud Tribble—who had left (or been forced out of) the project before its completion, and who therefore received little recognition when the Mac shipped. The interview's last question was, could something like the Mac be done again in 1984(!); Howard's answer was telling: "I think it could, but only by a similar process, a little group splintering off, working separately from the big group. I don't think it could be done on purpose, as Macintosh was not done on purpose."

When I look back at the last seven years, I realize how few major changes or improvements there have been in the Mac design over that period. There's been the Hierarchical File System (which should have been there in the first place), slots, color, varying screen sizes, the virtual desktop, and some limited I/O processing in the IIfx (currently unusable under the Mac OS). That's about it.

This suggests that Apple is either heading down a blind alley or that Apple's best resources are going into a new generation of machines designed to supersede the Mac, as the Mac did the Apple II. Either case suggests that the Macintosh design has peaked and has started down the long slope toward death. The Macintosh project started ten years ago; in another ten years, I doubt Apple will be selling Macintosh systems, though there will still be millions around and in use well into the next century.

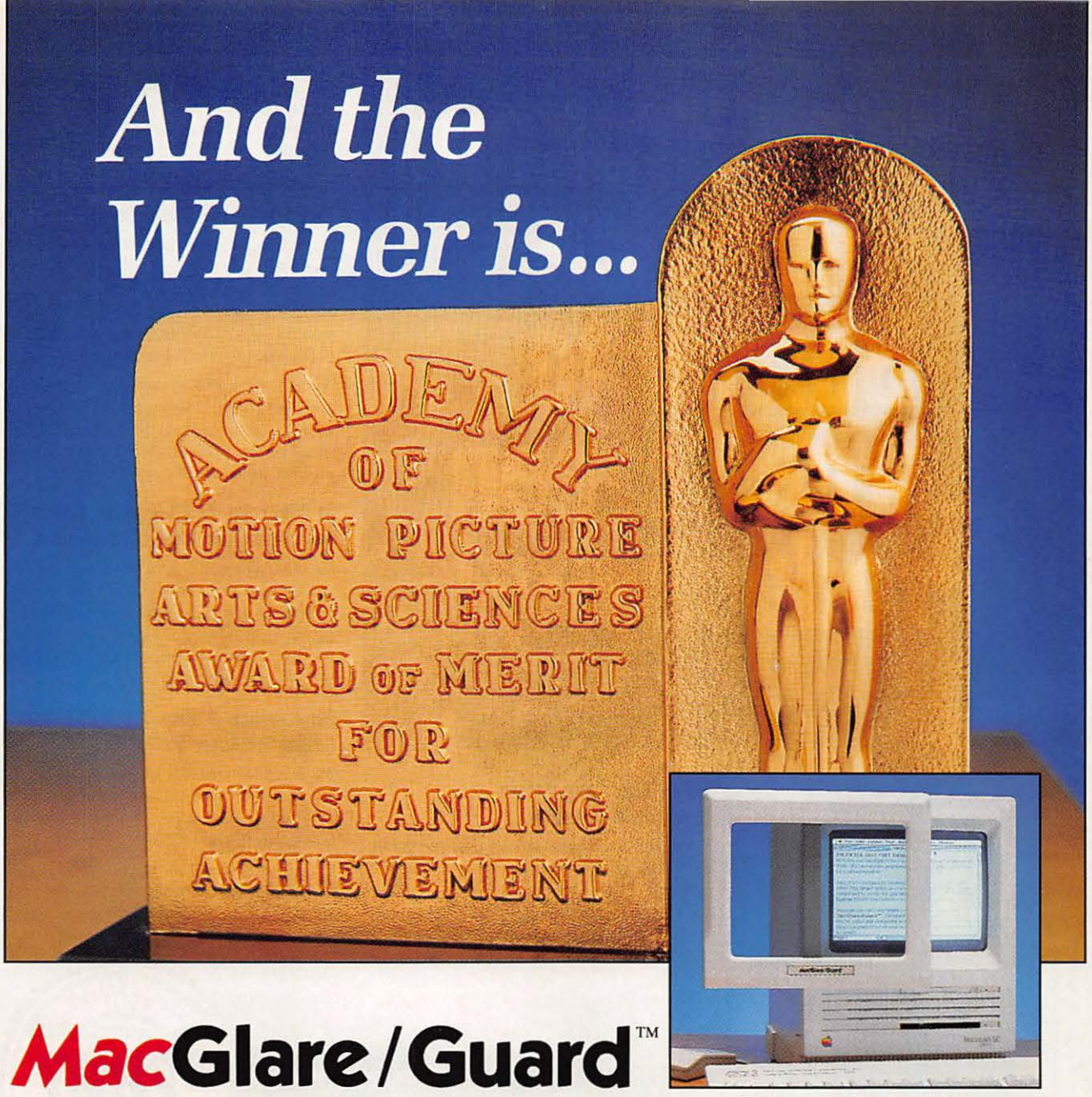
The Mac is dead. Long live the Mac.

Contributing editor Bruce F. Webster is vice president of R&D at San Diego–based Pages, Inc. He can be reached via BIX (bwebster) and via MCI Mail (Bruce Webster).



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Resolution (dpi)	80	72	72	72
Vertical refresh	75	78	75	74
Pop-up menus	Yes	Yes	Yes	Yes
Enlarged menubar	Yes	Yes	Yes	Yes
Enlarged cursor	Yes	Yes	Yes	Yes
Screen saver	Yes	Yes	Yes	Yes
Screen copy	Yes	Yes	Yes	Yes
Full year warranty	Yes	Yes	Yes	Yes
VideoPaint	No	No	Yes	Yes
DeskPaint v1.5	Yes	Yes	No	No
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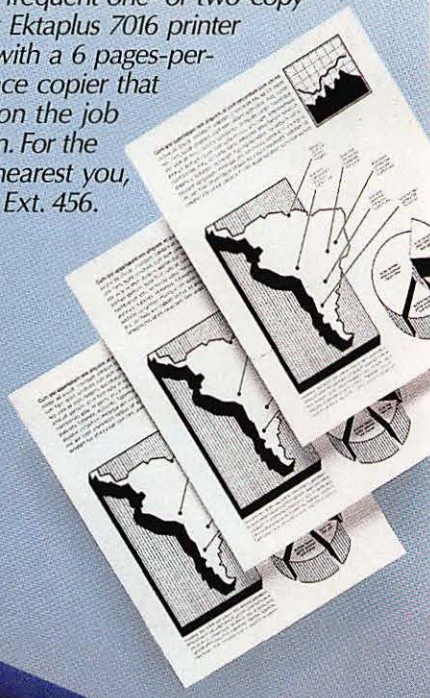
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An interview with Sören Olsson, president of Apple Europe

BY JERRY BORRELL

Sören Olsson has spent most of his life and career in Sweden, where he was born in 1945. While studying chemical engineering he began using computers in research but gradually became more interested in the mathematical aspects of the sciences. In 1969 he began work for Hewlett-Packard, where he remained for 15 years. He joined Apple in 1984 as director of Apple Sweden. In 1985 he became general manager for the Nordic countries, then was made vice president for northern Europe in 1988.

Last year Olsson was chosen to fill Michael Spindler's former position as president of Apple Europe. Olsson's demeanor and staid white shirts belie a warmth known only to initiates of Scandinavian cultures. Even today he carries an enthusiasm for Apple Computer rarely seen in the United States.

MW How did you start at Apple?

OLSSON I decided to join Apple Computer after being offered the general managership for Sweden. I wondered if Apple could make a second success like the Apple II. My friends said to look at the Apple III and the Lisa, that there was no second great success in store for the company. In 1983 at Comdex, I kept wandering by the Apple booth and passing by the Lisa. You recall the paradigm shift that machine represented. This was another way of doing computing. And the Mac was being talked about in late 1983. I saw the Lisa and thought about it at a lower price and knew that it would be a winner and would start new business, and that it was a fantastic product. That's why I joined.

MW Why has the Mac been so successful in Scandinavian countries?

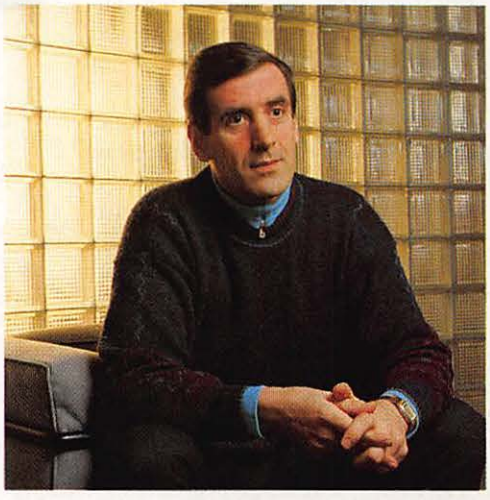
OLSSON The Mac has been successful all over the world. During my first six weeks at Apple I spent time chatting up all of the company's channel partners [retail sellers] to get them enthusiastic. Everyone welcomed me, but no one made a commitment. I asked all the big resellers to put their resources behind the Mac. I told them that I wanted dedicated teams to sell the Mac. No one was willing to make that investment.

So I went back to see the largest five resellers. I said "I'm going to choose one of you five to be our outlet." And I asked them to tell me why I should choose one of them for the job. We were lucky that two of them said that they wanted to distribute the Mac. But [even they] said that it wouldn't work, that there was only MacPaint and MacWrite. That was a major issue then—[the lack of] applications. I decided that Apple Sweden would become a Microsoft distributor to convince Microsoft to do a [software] localization for this market.

There were no resellers. No channel. I asked, Where are our friends in this market? And thought of the universities. Like in the U.S., where universities formed consortiums to use the Mac. I asked Michael Spindler, "If we can get one university to support us, can we sell very aggressively?" He said, "Yes, go ahead." So I met with the University of Lund. And some Macs were carried back [to the school] by hand. It proved to be a perfect fit.

This will probably go down in the history books. It was the first time a university in Sweden made a cooperative agreement with a commercial computer company. There was government investigation afterward because of the perception that the students would be required to purchase the computer and to use this or that with it. But we got PR and exposure from that . . . and that helped us in business [markets]. And over the next six months all of the Nordic countries, including Iceland, had distributors.

(continues)



PHOTOGRAPHS BY STEVE MUREZ

MW What markets does Apple Europe deal with?

OLSSON I talk about a new Europe: Western Europe now including the USSR, Poland, Czechoslovakia, Hungary, Albania, Yugoslavia (where we already do some business), the Middle East, and Africa.

MW How do you rank your markets in terms of importance?

OLSSON In two ways. By overall potential and by where we are today. First are France, the United Kingdom, and Germany. France is important, but in the future, with the unification of Germany, it [Germany] will play a new role as a hub of Europe and in the development of Eastern and central European countries. Development will spread via Germany.

Of the current markets, we have done extremely well in France, Sweden, Finland, and Switzerland. We are a major player in all these markets, with a 15 percent share in each.

MW Does Apple plan a second manufacturing center for Europe in the Netherlands?

OLSSON Apeldoorn, in the Netherlands, will be a northern European operations center. It will also serve in distribution and localization, not manufacturing. We plan a [manufacturing center] in southern Europe: either Spain, southern France, or in northern Italy.

MW What are your plans for Eastern Europe?

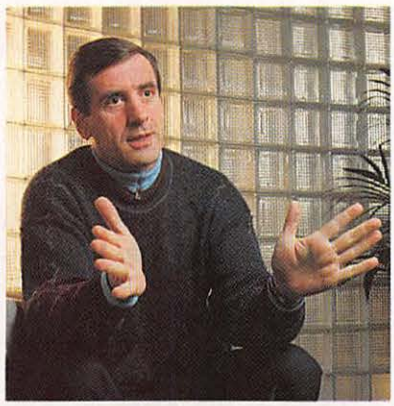
OLSSON I think that right now we need to get businesses to fit each country. What we are doing is to prioritize on Hungary and Russia—the localization for these two, and for Poland and Czechoslovakia.

MW How long will that take?

OLSSON I don't know. And I don't want to set expectations for these markets. I think of them in the near term not as a country market, but as an IS [Information Systems] strategy for the end of the nineties. One-third of the European business market is in Eastern Europe.

MW Have the recent events in the Soviet Union made a difference to Apple's plans there?

OLSSON Political developments have not changed our beliefs or our priorities. We looked at the Soviet Union as a long-term opportunity from day one. If we had been more opportunistic and tried to sell more Macs, then today's events would have made an impact. Some people have been critical of me for not working harder to make sales there, for not taking the short-term view of how many Macs can we sell today. I have taken the long-term view of building the relationship, so that if there are hiccups in the politics, we can review our position. But really, the Soviet Union has no other options. They must computerize their society if they are to keep up. So for us there is no change. We are continuing to build relationships and to strengthen our partners, such as the University of Moscow, which is now officially involved in the localization of our operating system. The university may become our first official reseller in the Soviet Union.



The Soviet Union must computerize its society if the country is to keep up

MW Will Apple Europe ever design a computer?

OLSSON My dream, absolutely. We need to commit to research in Europe and make an increased investment. Who can tell what research and development will do in Europe, Cupertino, and Tokyo in the ten years to come—we'll serve a great many things in different countries. Apple's vision is to empower individuals with technology. Europe can bring a lot to that: ISDN, networking.

MW Traditionally, haven't system software releases been a problem in Europe?

OLSSON In the past we used to lag with software releases in different countries. Last October we were able to release a total of 13 different versions of System 6.0.7 simultaneously in the U.S. and Europe.

MW In 1992 the market for Apple in Europe will change.

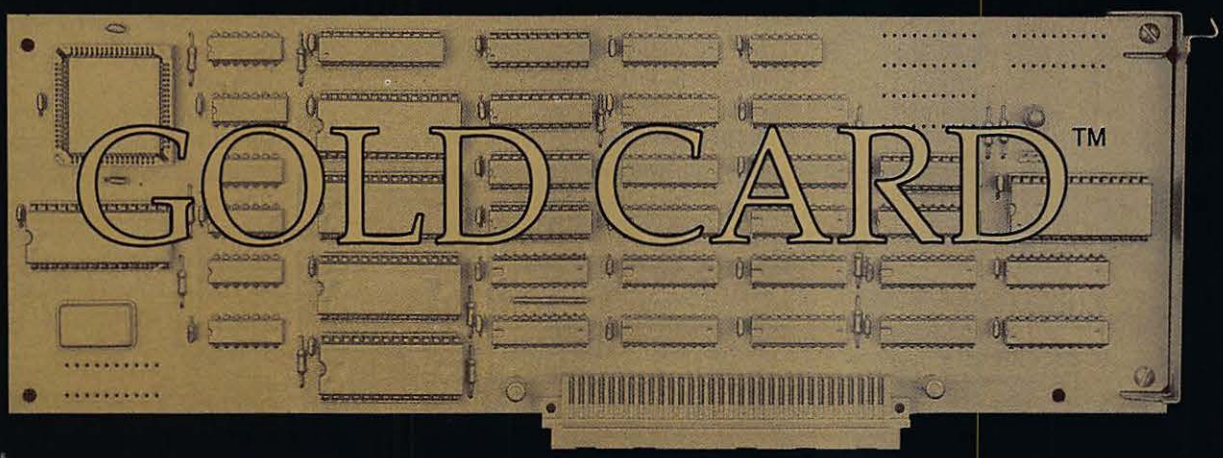
OLSSON We're ready. It's already '92 from our point of view. We have European pricing, strategy, and the margin structure is the same across Europe. '92 is a good milestone to bring the Continent together for one market.

MW You have chosen the United Kingdom as a test market in Europe for the Macintosh LC, providing shipments there over other countries. Why?

OLSSON We have actually picked three countries, the United Kingdom, Italy, and Sweden. Why did we choose Italy? Because it is truly dominated by DOS machines from IBM and Olivetti. This gives us a good opportunity to understand what will be the effectiveness of the LC [in competition with DOS machines] and could help us with new thinking about the Italian market. In terms of why Sweden, we wanted to look into one market where we had good market share. We couldn't use France or all of our production of LCs would simply disappear—the market is too big. The Classic, of course, is doing well over all of Europe, but we wanted to see what the impact of the LC would be on an existing strong

(continues)

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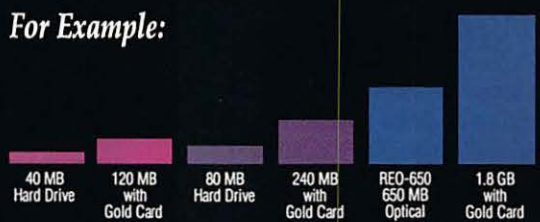
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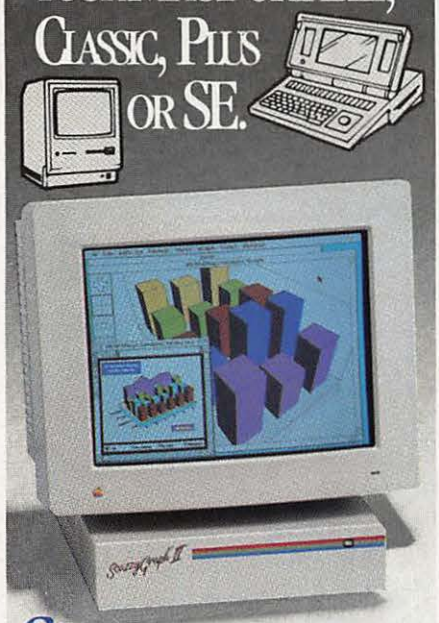
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market. The United Kingdom is also an area where we have a relatively low market share, but the market is fragmented [among many PC vendors]. Our hope and belief is that the LC is the winning card that will allow us to return to the relative strength of the Apple II in that market in 1980. The LC is our opportunity to return to the U.K. market.

MW How have the Classic and the LC fared now in their sixth month?

OLSSON Not only have they fulfilled our plans but also they have surpassed our hopes. Now I can tell you some figures from our first quarter. We have increased our sales shipments in Europe 100 percent over last year in the same quarter. No other company in Europe has increased its market share in personal computers, but I can tell you that it is a reality for us.

The Classic is at the lead. We made a big mistake by misunderstanding the impact of that machine. We sold more than a factor of two over our forecast. That makes it sound like we don't know about our own business, but look at other companies that didn't achieve one-quarter of their sales expectations. That tells us how difficult it is to make accurate sales projections. On the other hand, it tells us about the Mac's success in the marketplace.

MW What about the LC? Has it been as successful as the Classic?

OLSSON In December we began tests in the U.K., Sweden, and Italy, and we completed the tests in January. Before the tests we predicted that the Classic would be the student machine, and so for the last four months we have positioned the Classic as a student machine. [We assumed] the LC would certainly be better liked by students and educators, but not small business. But [while] the Classic has been seen as a better entry machine for students, the LC has had a similar phenomenon of acceptance for business applications, especially in horizontal applications, presentations, and business graphics. So now we are faced with the challenge of how to manage this mix of CPUs.

MW How do you characterize Macintosh sales in Europe overall?

OLSSON Overall in 1990 in the European market, 6 million personal computers were sold. Out of that, one-half—over 3 million—were sold in the $2500-and-under price range. Our point of view is that we only competed in the upper price range of systems. Our lowest-priced system [in 1990] was greater than $4000 [when fully configured].

We see the Classic, LC, and si as adding new business to Europe. For the first time, we can compete in the entire marketplace. Suddenly we are able to sell Macs right in the middle of the price range. We have both hope and belief in what the LC will mean to us. We have a color machine right in the middle of the market.

MW Apart from the architectural CAD market, Apple has not been successful in CAD. Many people say it is now too late for Apple to compete in this arena.

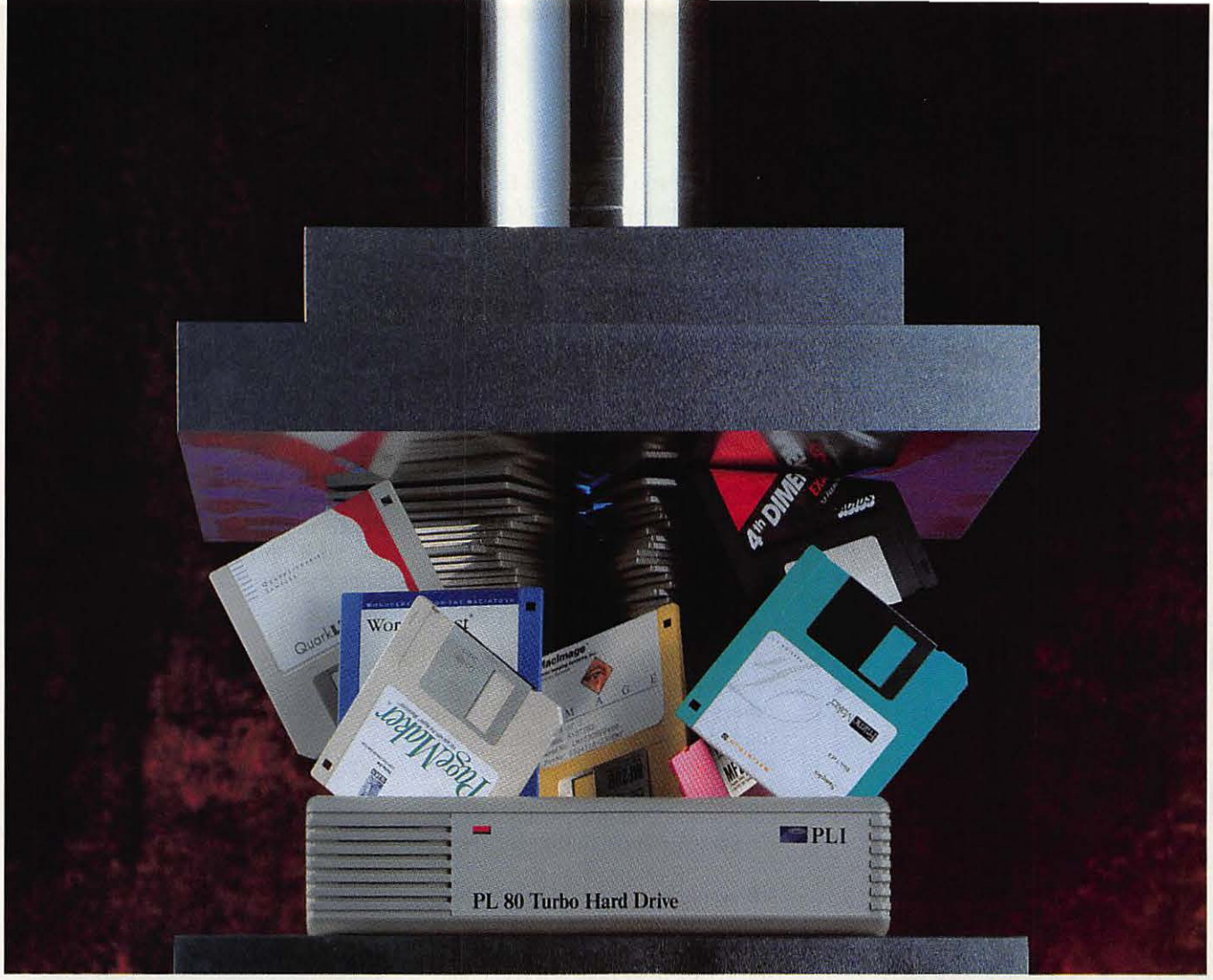
OLSSON I don't believe that it is too late. We talk about a market that is a moving target. We have to target areas with developers, and as we get forward speed, we have to be more customer and market focused. And to focus our resources we have to be sure that we have the right tools. In the engineering community that may be CASE, CAD, CAM, or others; there is a broad definition of CAD. The need of an electrical engineer is entirely different from that of a mechanical engineer.

I encourage you to believe that in the next 9 to 12 months we will move in that direction, and that it is not too late. We are addressing the market with partners in Europe.

MW Apple Europe has developed a seed or venture capital fund for developers. What is it? Why did you do this?

OLSSON When we created it we saw the need to broaden the development on our platforms. At present 90 to 95 percent [of application development] is done in the U.S. and North

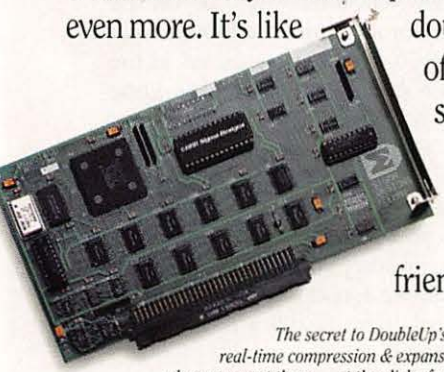
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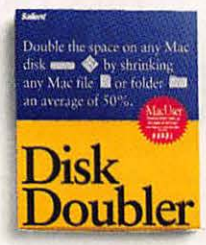
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America. If you look at the European computer industry, a few of the companies have been successful. But [Europe has developed] a lot of competence in the software point of view. Traditionally, software companies have worked with customers and not with specific application [development], so we need to help developers on the Mac. We saw this as an issue and recognized that, first, the home market is smaller than in North America. We needed to help not only from the dollars-and-capital-investment point of view, but also with tools. And to help them to go abroad, help them localize, and find channels for marketing their products.

So we asked what we should do. We founded Advent, and together with others we invested $15 million in the fund, but overall the total fund is $60 million. We look either for companies marketing applications on the Mac or companies developing technology interesting for Apple in the long term.

MW Apple is very visible in Europe, especially in France, and yet Apple is dwarfed by IBM in Europe. How will you compete in personal computers with IBM?

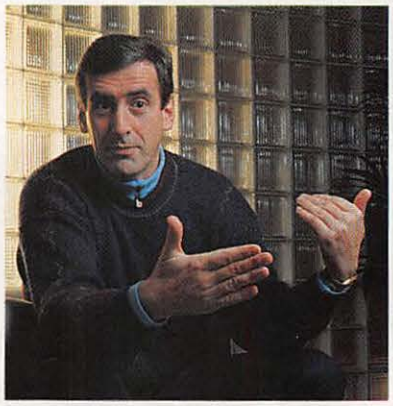
OLSSON In five years we won't outgrow DOS in Europe, where we compete with several platform technologies looking at the broad range of IBM PCs and clones, Compaq, Olivetti, and the third tier like Amstrad. I believe we can match any one of these brand names, including IBM in the DOS market.

MW The success of the Classic, si, and LC has been such that, as is the case in the U.S., dealers in Europe are upset with the lack of supply of new machines.

OLSSON There are two subjects that I face when I go out and work with the resellers, depending upon which quarter we're in. Either they're beating me down because we don't have Macs available or they are beating me up because they have no way to make money on selling our machines.

We are ramping up on products like the Classic. We originally planned to have the Classic and LC produced in Singapore. But now we produce the Classic in Cork [Ireland] and the LC in Fremont [California] as well. We are talking about going to a third shift in Singapore and air shipping; we're talking about building plants. We've doubled the size of the Cork plant. I am really pleased with the response from the manufacturing people at Apple. Eighty percent of the products we ship now are different from those we shipped in the last quarter!

MW In the U.S., we can't purchase the SE/30 in retail outlets, so I assume that this machine continued to sell well?



If we license our operating system, we should select partners who can bring something to the party

OLSSON There is also a shortage of SE/30s in Europe. Six months ago we asked ourselves what the impact of the new machines would be on the current product line. We thought that the SE/30 would be squeezed in the middle. But SE/30 sales have gone on to a higher level since the introduction of the new machines, so there was no [negative] impact by the introductions. It just goes to show that when you have winners in the product family, they boost the product line overall. We found out from the market that there is still a need for an

(continues)

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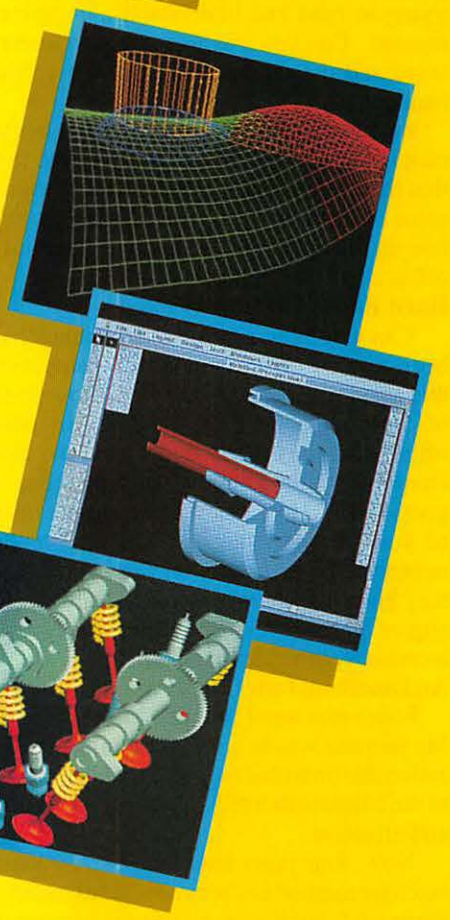
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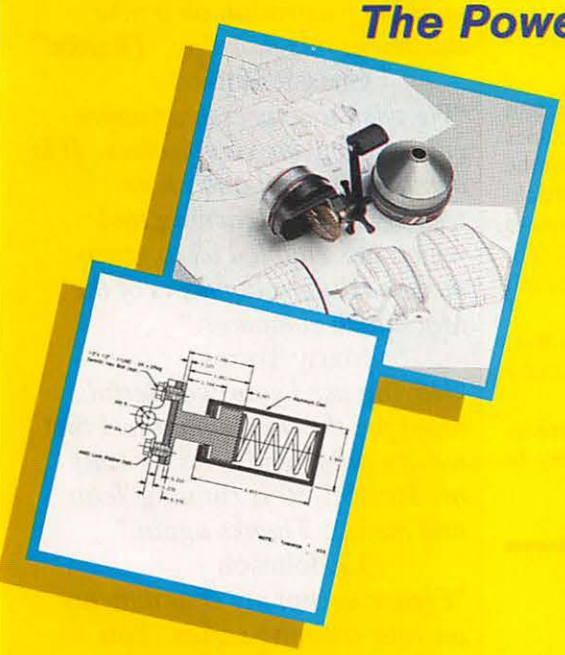
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all-in-one package, despite the lack of color.

MW Apple Paris, your European headquarters, has come under bomb threats recently. Is Apple singled out, or are you merely an American company?

OLSSON We all feel the importance of the war, especially here in France. I have heard a lot on television and radio that there is a great risk of terrorist attacks. The number of people in shopping centers is down 50 percent, and the number of people in the cinema has decreased by 30 to 50 percent. People are staying home.

Apple Europe has had five bomb threats already. IBM and EDS have had the same experience. Apple is not a particular target—[some] people see all U.S. and U.K. companies as targets.

MW What do you think of Microsoft's announcement of its intent to cease support and development of OS/2?

OLSSON I remember April of 1987, when the world said that OS/2 was the end for Apple Computer and that OS/2 and PS/2 would dominate. The thought at the time was that Apple wouldn't make it. I must admit that we said we had a six- to nine-month window of opportunity, which we extended every month, quarter, and year as we moved on.

Microsoft's decision means that it will be IBM that moves PS/2 and OS/2 forward. I wonder how long IBM would have made it against all of the clones [without this move by Microsoft]; now the company [IBM] can contribute if it does OS/2. It will try to move the PC forward. Microsoft will address all of the clones now; it will put more muscle behind all of the platforms with which we compete.

MW What are the implications for Apple of its intended move to license the Macintosh Operating System?

OLSSON It is important, especially with the fragmentation of platforms, that we gain a worldwide market share of 20 percent. If we can achieve that, we'll lead the world. It is not possible for Apple to do this on its own.

Licensing the Macintosh Operating System is not on the agenda today. If we do it, we will need some carefully chosen partners, and it is important that those partners bring something to the market besides building a Mac clone. Beginning with the Classic and the LC we had to look at different margins. From a hardware point of view, we are already competing with clones. So if we should license our operating system, then we should select partners who can bring something to the party. For instance, who can add support, or who would change how we do business.

MW There was a recent hiccup with the Portable. A new version was set for release and then pulled back. Then it was reapproved for release. What happened?

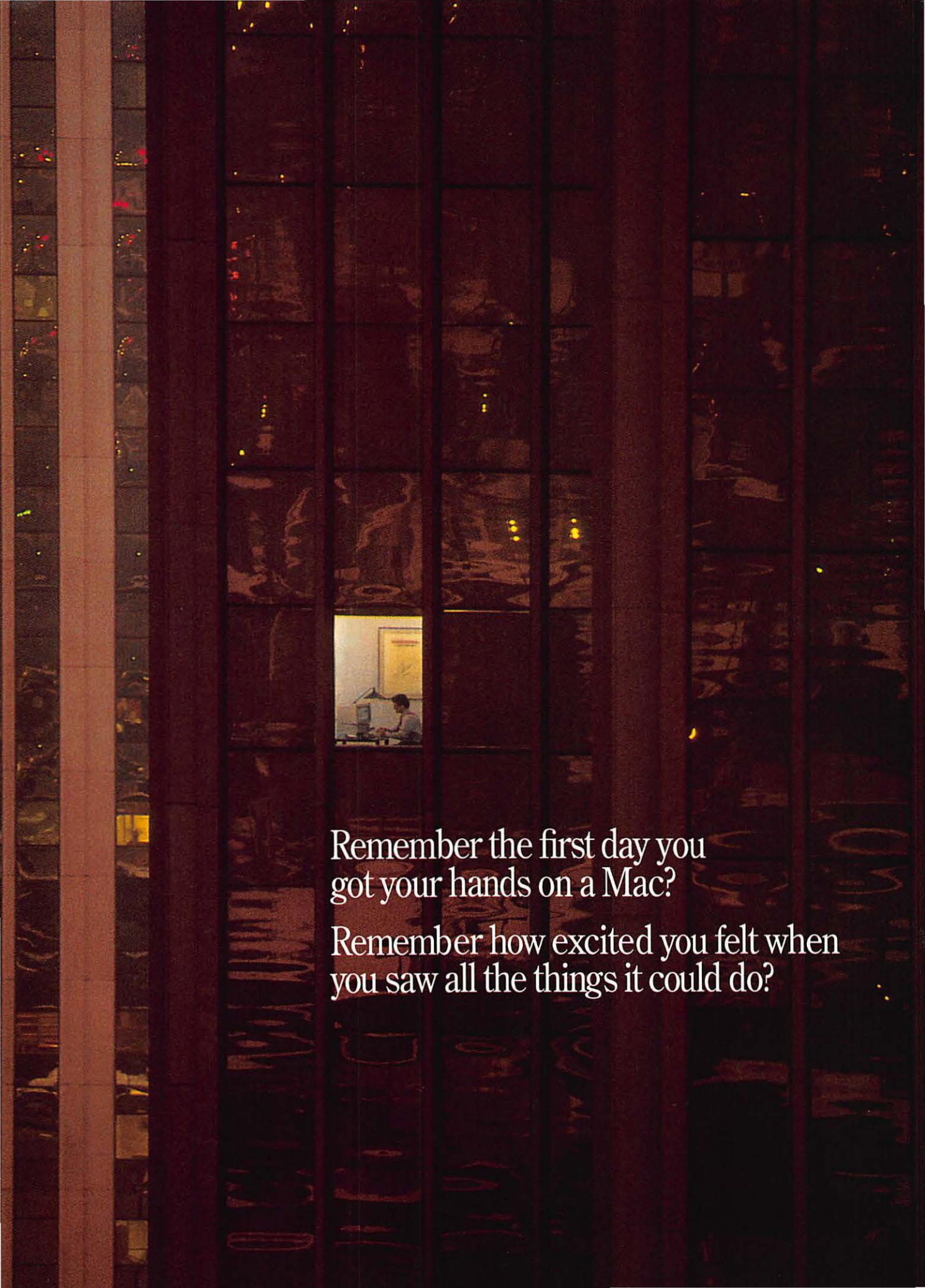
OLSSON Well, I don't know the exact or technical reasons. The Portable was and is a good machine in both the way we designed it and the way we put it in the market. But some people confused it with laptops. The new version of the Portable has an improved display, and we expect current levels of sales will remain. It is not a major intro, but the customer will see an improvement in the machines.

It is always embarrassing to delay shipment of a product, but our customer surveys on the Portable are favorable. I use a Portable if I have to work at different locations. The market [for laptops] is broader than for our Portable. The customers ask for more performance, more portability. And we know that laptops are the fastest growing segment of the computer market.

In Europe, the unit growth [for laptops] was 50 percent for 1990. We are not competing in the laptop segment. Given that, our growth of market share in Europe is even more impressive. I don't know when, but we will have a laptop.

MW Canon, one of Apple's longest-standing suppliers, introduced its new personal printer at the CES show in Las Vegas last year, several months before Apple introduced the same printer. What happened?

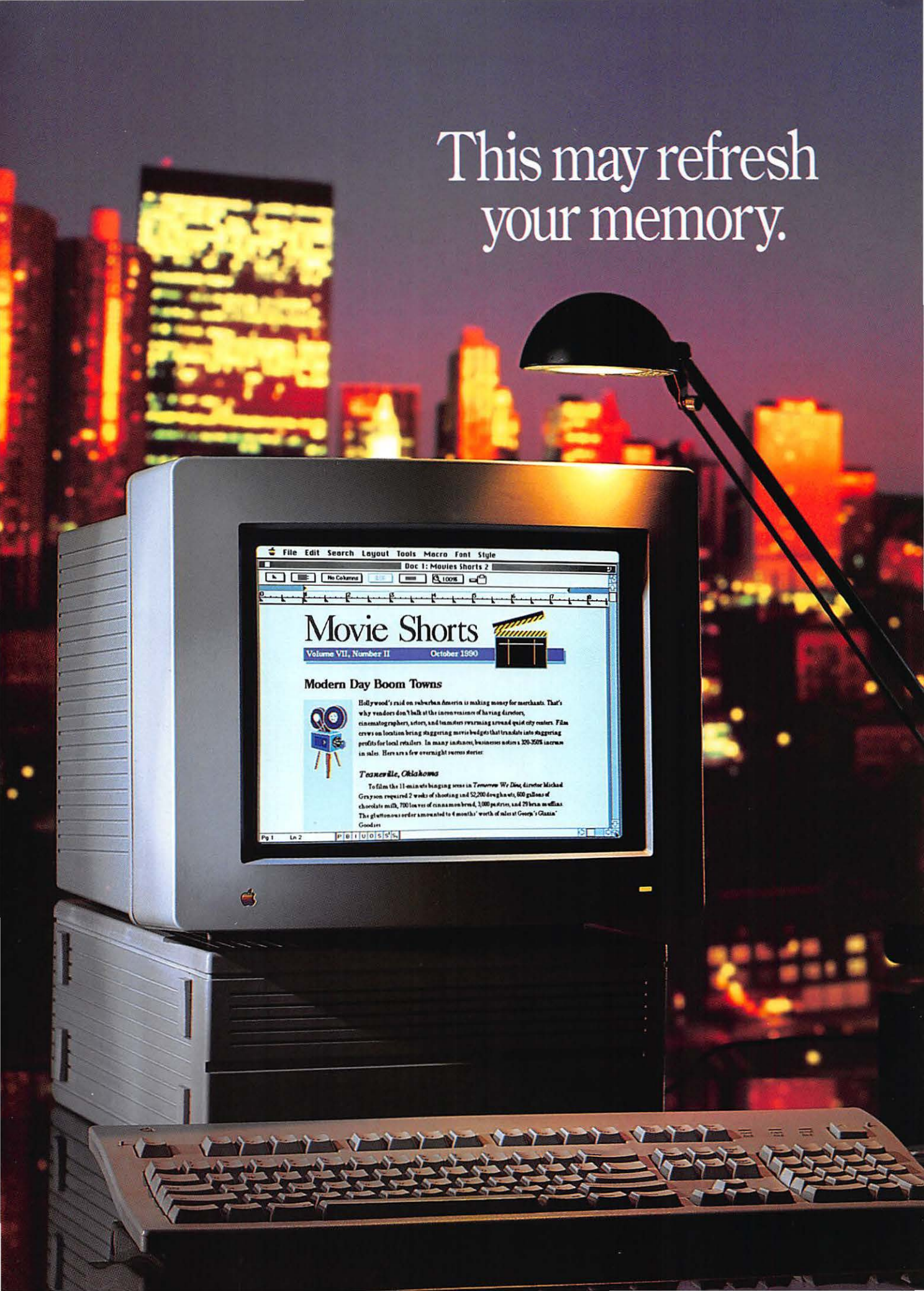
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Remember the first day you got your hands on a Mac?

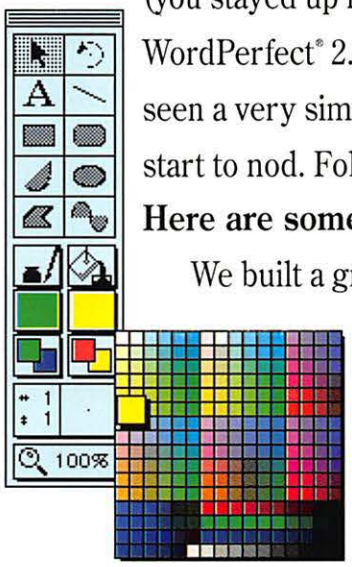
Remember how excited you felt when you saw all the things it could do?

This may refresh your memory.



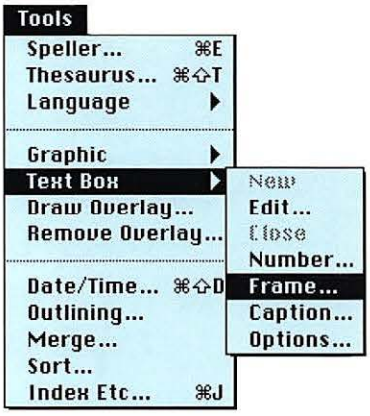
Introducing WordPerfect® 2.0.

Every once in a while a new product comes along that sparks the same kind of excitement you may have experienced with your first Macintosh (you stayed up half the night, right?). As we've shown new WordPerfect® 2.0 to Macintosh users around the country, we've seen a very similar reaction. First eyes open wider. Then heads start to nod. Followed by grins that stretch dimple to dimple.



Here are some of the more graphic improvements.

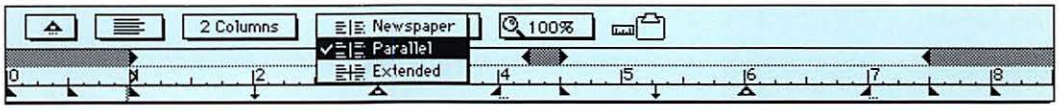
We built a graphics and drawing package right into the program. With WordPerfect 2.0, you don't have to leave your document to incorporate graphics. You can create, edit, size, scale and crop graphic figures just by clicking "graphics" or "draw" on the pull-down menu. The palette includes all of the standard drawing tools, plus Bezier curves, polygons and a free rotation tool.



WordPerfect 2.0 also lets you create text boxes. Inside your text box, you can change font size and attributes. Then you can drag your text box wherever you want in your document and the rest of your text will wrap around it automatically.

The list of new features could fill a page. Or up to 24 columns.

By clicking and dragging icons on the new WordPerfect ruler, you can



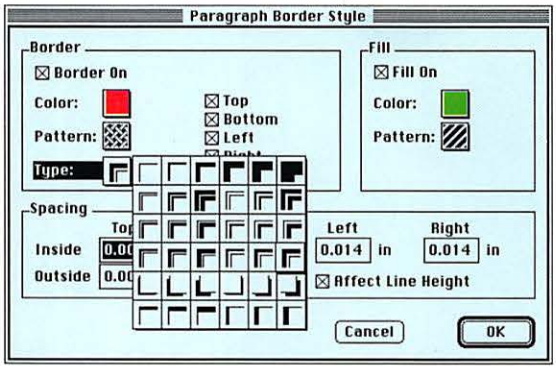
create columns (newspaper or parallel) and then adjust the column settings, align text, set tabs, change line spacing, move margins and do a number of other formatting changes to your document.

Want to add a border to text, paragraph, column, or page? Easy.



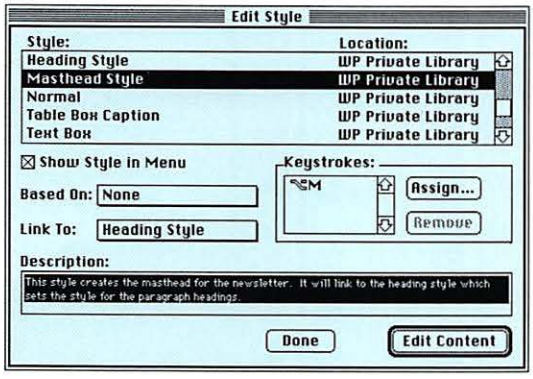
WordPerfect 2.0 gives you 36 different border styles from which to choose.

Like working with Styles? WordPerfect not only lets you use them, you can also share your styles with other people on your network.



The Speller comes with an expandable 125,000 word dictionary. The Thesaurus isn't just an add-on, it's on-line. We've also added new features like a Macro Editor, Tables of Authorities, and Line Numbering. And we've made enhancements to Merge, Search and Replace, and Macros.

Of course, what counts is how you feel.

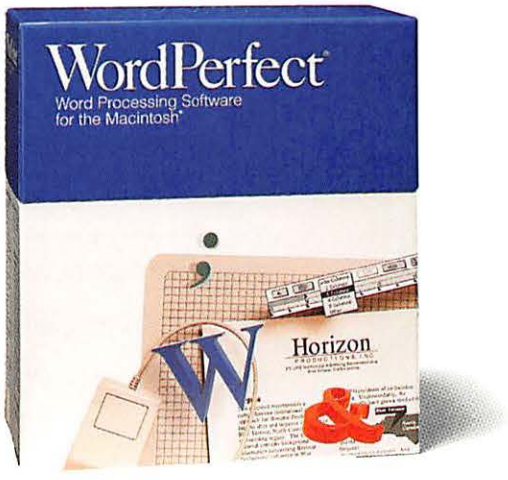


See WordPerfect 2.0 up and running at your dealer. Better yet, buy a copy of WordPerfect 2.0 and load it onto your Mac. For a limited time, your dealer can give you a great trade-up allowance for your version of Microsoft Word. But when you try WordPerfect 2.0 for the first time, one word of warning. Don't plan on going to bed early.

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*Suggested price. Offer good in the United States only.

OLSSON I don't know. I was surprised. If I speculate, I could say that it is related to what happens when Apple introduces a product. What we learned from the LC and the Classic is that demand does not build up over time. Demand is instant. In the mini or mainframe computer market you talk to customers and they buy one at a time. In this market you announce a machine and the customer expects to be able to buy it, especially in peripherals. So we need the printer in the thousands. Why Canon announced the printer before us, I don't know.

MW One of the missing pieces of technology for Apple is rich text; that is, text with attributes that can be used across all applications or platforms. When will Apple Computer address this issue?

OLSSON Transfer of rich text across different applications and different platforms should have top priority. Many application developers insist on keeping proprietary document-storage file formats, thinking this is a part of their competitive advantage. I think users would rather see them adopt a common file format. Two years ago Apple's European R&D organization began an effort to integrate ODA [Open Document Architecture] standards within the Macintosh architecture. Our approach is to provide a tool kit enabling developers of applications dealing with rich text to convert their documents into ODA format and vice versa. We are planning to make evaluation versions of this tool kit available to selected developers during 1991 for feedback.

MW Recently we have seen the announcement of the first of a class of machines likely to be legal clones. What will be the impact of Mac clones on Apple Computer?

OLSSON That is a tough one. My first reaction is that if someone has gone to the trouble to make the investment required to make a legal clone of the Mac then that is a great endorsement. I don't think that I want to comment on such machines.

MW But what about from a market point of view?

OLSSON In terms of our strategy over the last year, it relates to the fact that we need to be a bigger player in the market. It would relate to our licensing of the Macintosh Operating System. If we make that decision, then we would have to compete with our own clones. Our point of view has to be price competitive, to control costs. We already compete with DOS clones in terms of the prices of the new machines. We have to compete with everybody. If there is a legal Mac clone, then it may help us increase the Macintosh market. So it's good news and bad news. One thing is clear, that business as usual does not apply to Apple Computer any longer. ■

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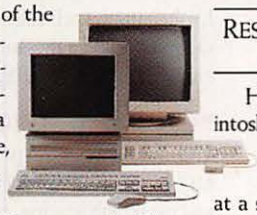
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MACWORLD NEWS

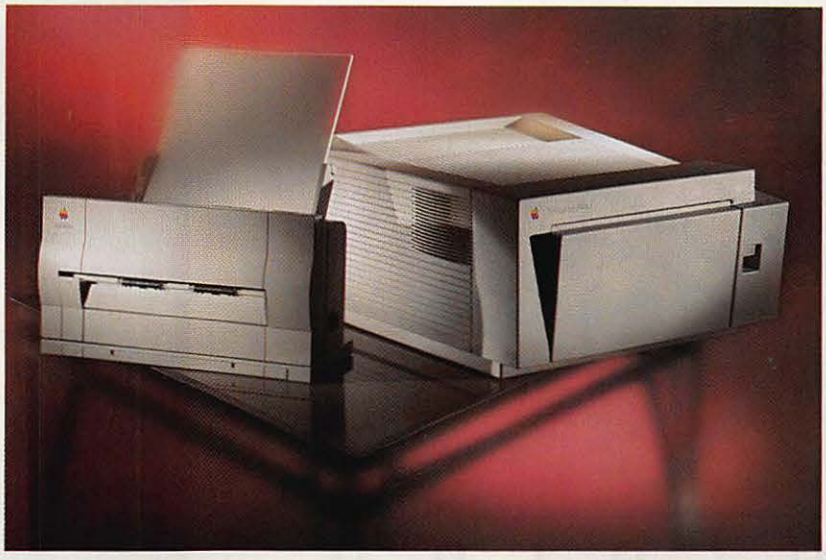
by Dan Littman and Tom Moran

Apple Unveils Low-Cost Printers

Apple has done for its printer line what it did for the Mac family last October: unveiled low-cost units while slashing the prices of most existing models. The latest Apple printer line should delight users and put more price-and-performance pressures on third-party printer manufacturers.

The stars of the new printer line are the $599 StyleWriter and the $1299 Personal LaserWriter LS (see "Personal Page Printers Arrive," in this issue). The StyleWriter is Apple's first ink-jet printer. Based on a Canon-built print mechanism, it boasts an output resolution of 360 dpi—almost 40,000 more dots per square inch than the 300-dpi resolution of the Hewlett-Packard DeskWriter, which retails for $995. The 5-pound StyleWriter is eminently portable, and Apple expects numerous companies to introduce battery packs for the printer.

The Personal LaserWriter LS is built around the Canon LX engine used in the Personal LaserWriter NT and SC, both of which remain available (for now—the SC's life span is limited). The LS, however, doesn't include the 250-sheet paper tray found in its costlier siblings, only the 50-sheet multipurpose tray. The LS also eschews SCSI in favor of a simpler serial connection. The printer's controller board is a model of design elegance, containing fewer than a dozen components, one being a custom-designed chip that manages a sophisticated compression scheme that enabled Apple to build just 512K of memory into the printer (other laser printers require 1MB of page-buffer memory).



MARK JOHANN

The portable StyleWriter (left) and the Personal LaserWriter LS set new price-performance levels for Apple. The company also cut prices on most of its existing printer models.

The StyleWriter and Personal LaserWriter LS use Apple's TrueType outline fonts. But instead of delaying the printers' release until System 7.0 becomes available, Apple decided to create a version of TrueType that works with System 6.0.7. The StyleWriter and LS will ship with a floppy disk containing the TrueType font files, the printer driver, and a system extension (an INIT) that rasterizes the fonts for the screen and printer. Both printers work with any Macintosh containing 1MB of memory and a hard drive. Both are also compatible with Adobe Type Manager. The LS's driver supports background printing under MultiFinder (new versions of the Backgrounder and Print Monitor applications are included with the printer); the first release of the StyleWriter driver does not support background printing.

As for Apple's existing printers, the LaserWriter IINTX's price is now $4999, down nearly 17 percent from $5999; the LaserWriter IINT now costs $3999, down 11 percent from $4499; and the Personal LaserWriter NT retails for $2599, down 21 percent from $3299. For more information, contact your Apple dealer.—**Jim Heid**

Interleaf's New Folio

People often think about books, but how often do books think about people? Interleaf is building a LISP-like artificial intelligence programming language into version 5 of its technical-documentation software. With this technology, called Active Document architecture, a programmer can create documents that understand how people use them and modify themselves to be more useful.

Grumman Space and Electronics Division in Great River, New York, is incorporating Interleaf's Active Document technology in the Portable Maintenance Aid (PMA), which Grum-

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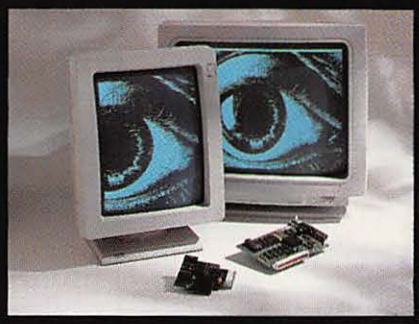
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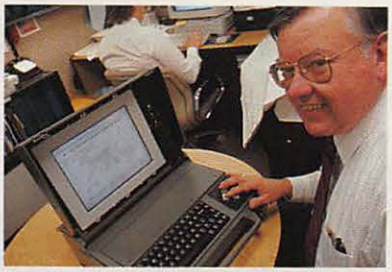
24-Bit Color Display Adaptor for the Mac II. Displays photographic quality images on most 13" and 19" displays, including our 19" Trinitron display.



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Grumman's Emil Pavlik with about 45,000 pages of documentation packed into a lunch-pail-size Portable Maintenance Aid.

man developed, under an Army contract, for use with military weapons systems. The PMA holds 200MB of documentation in Interleaf format. A technician can plug the PMA into a jet's data bus, study information from the jet's instruments, and instruct the PMA to display diagrams showing how to remove a malfunctioning part. Other Interleaf documents write up an electronic invoice for replacement parts and upload it to a mainframe when the technician gets back to the shop; all along, the system is teaching itself how a skilled mechanic proceeds so that it can accelerate the diagnostic process next time.

Interleaf version 5 has other new features besides the Active Document architecture: standard hypertext links and links based on conditions; hot links that import dynamic data from another file, even if that file was created by another application; tracking revisions and reconciling multiple versions of documents.

Interleaf's earlier Mac versions were poorly received because they lacked many features available in the UNIX version and violated Mac interface standards, but Interleaf says version 5 will be full-featured and sport a real Mac interface.

Pricing was not set at press time. For more information, contact Interleaf in Cambridge, Massachusetts, at 617/577-9800.—**D.L.**

Wise Words for War

In recent months we've seen that the end of the Cold War does not mean the end of war. At General Dynamics in Fort Worth, Texas, engineers are designing military jets that aren't scheduled for the front lines until early in the next century. Among these jets' high-tech capabilities is the ability to respond to a pilot's spoken commands.

General Dynamics contracted with Emerson & Stern, a small company that has written linguistics and language-learning software for the Apple II and the Macintosh, to develop speaker-independent speech recognition for what General Dynamics calls "hands-off, heads-up data entry." The company is testing Soliloquy, as it's been dubbed, on Macs, though the program can run on any computer including aircraft computers. A Macintosh version of Soliloquy is also available to commercial developers for such uses as telephone order systems.

General Dynamics had several requirements for Soliloquy: complete speaker independence; the ability to handle continuous speech, including strings of numbers (pilots frequently change navigation and radio frequencies and can't pause for a confirming beep between digits); and very high accuracy. General Dynamics also wanted a software-only product that wouldn't add weight to the aircraft.

As one General Dynamics engineer explains it, Soliloquy "is based on phonetic production, not phonemic perception"—in other words, using technology that Emerson & Stern won't describe, Soliloquy determines the mouth shape that produces a sound; most speech-recognition programs graph the sound waves and compare the graph to a database of graphs. Emerson & Stern claims that Soliloquy can recognize sets of about 200 words on a Mac IIci and can switch between word sets in real time. It also can filter out ambient noise but may require a special filter module for some environments.

For more information, contact Emerson & Stern in San Diego at 619/457-2526.—**D.L.**

Epson Enters Mac Arena

Printer giant Epson America has introduced the EPL-7500, its first PostScript printer designed to work with the Macintosh. The 6-ppm printer uses a Weitek RISC chip to speed processing. It comes with 35 fonts, two slots for font cartridges, and 2MB of RAM expandable to 6MB.

Based on a Minolta SP101 laser printer engine, the EPL-7500 produces 300-by-300-dpi resolution on letter- or legal-size paper, transparencies, envelopes, cardboard, and paper with punched holes. The cardboard can range in weight from 24 to 42 pounds. The EPS-7500 has a paper sensor that notices whether the print medium is thick or thin paper, a transparency, or a sheet of labels. The printer then changes the fusing temperature and the amount of toner accordingly. It comes with one 250-sheet paper cassette; a second 250-page cassette is optional.

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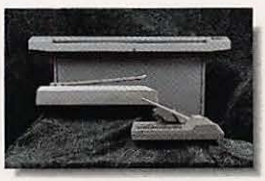
The Microtek MSF-300Z Color/Gray scanner reproduces everything from 24 bit color to 8 bit gray-scale to black and white line art. All at 300 dpi. Making it the one image capturing device that's ideal for desktop publishing, multimedia projects, presentations, even pre-press work.

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The 6-pages-per-minute EPL-7500 is Epson America's first PostScript printer designed to work with the Macintosh.

Since the EPS-7500 is also designed to work with IBM-compatible personal computers, it includes PCL 04 as well as PostScript version 52.3, and has a parallel interface in addition to its serial and AppleTalk connectors. The rated duty cycle is 3000 pages per month, and the imaging cartridge lasts for about 6000 pages.

The EPS-7500 has a suggested list price under $3500. Epson expected to begin shipping in January. For more information, call Epson in Torrance, California, at 213/782-0770 or 800/289-3776.—**T.M.**

TV Studio on a Board

The Video Toaster mixes analog video with digital information on a board. It provides software to create special effects and to function as a production switcher, frame buffer, titler, and frame grabber. Though the Video Toaster requires an Amiga 2000 or 2500, NewTek is promoting a Toaster-Amiga combination as a Macintosh peripheral that can be connected to a Mac with an RGB-to-NTSC encoder like RasterOps' Video Expander board. NewTek designed the Video Toaster to run on the Amiga platform because the Amiga's frame rate matches the NTSC standard, so no scan conversion is necessary, as it would be on a Macintosh.

The Toaster allows you to manipulate live video in real time to create hundreds of digital effects including flips, spins, tumbles, slides, mirrors, splits, zooms, blinds, and digital trails. As a production switcher, the Toaster creates dissolves, wipes, and key and color effects, and it can switch between four inputs, two frame buffers, and one color-background generator. The Toaster accepts any composite video source and writes to any tape that accepts composite video. The titling software is integrated with the Toaster switcher, so it is possible to have spinning, tumbling, and zooming title screens. NewTek is adding the ability to read and write Macintosh bitmaps, some 3-D formats, and PostScript files so they can be animated or used as overlays.

The Video Toaster lists for $1595. For more information, contact NewTek in Topeka, Kansas, at 913/354-1146.
—**Fred Terry**

Hydra Lets PC Users into Mac Heaven

Hydra Systems has introduced an add-in board for IBM PC XTs, PC ATs, and compatibles that lets those systems run monochrome Mac software. The board lets you switch back and forth from an MS-DOS screen to a Mac screen just by clicking and dragging with the third button of a three-button mouse. The Mac screen slides over the DOS screen, replacing it. The user reverses the procedure to return to the same place in DOS.

The Hydra One board currently requires a user-supplied Mac ROM; Hydra says it is taking the clean-room approach to cloning the ROM for a future version of the product (see "Send in the Clones," *Macworld,* April 1991). That project is probably a year away from completion, according to Hydra. To avoid legal problems with Apple, the company has licensed the Xerox Star interface, on which many Mac interface features are based.



The Hydra One board lets PCs run Mac applications from the Finder. The board includes the ROM from a monochrome Mac.

Hydra said it would begin shipping the Hydra One in February at a list price of $995. For more information, contact Hydra in Cupertino, California, at 408/996-3880.—**T.M.**



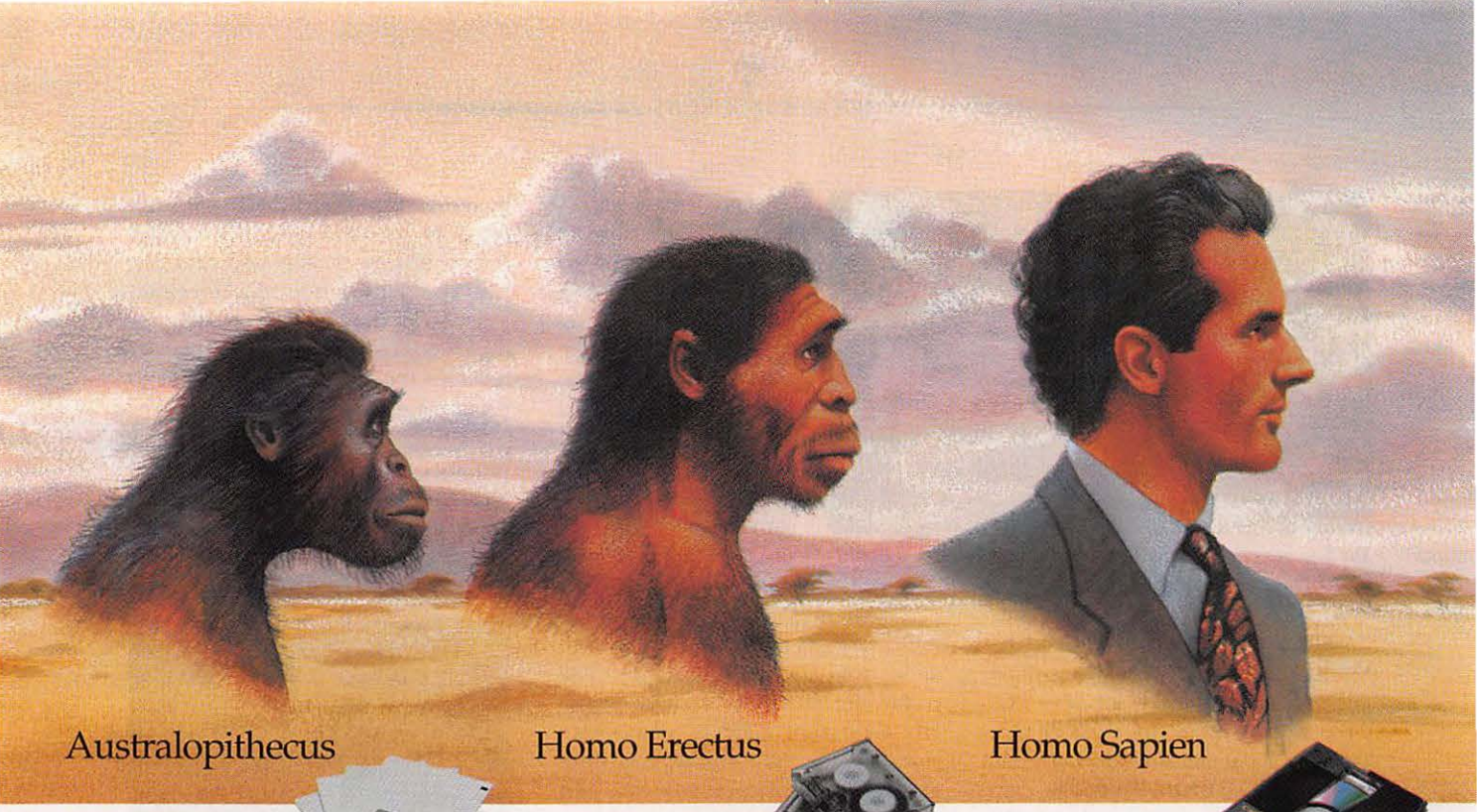
ROBERT HOLMGREN

Peter Tjeerdsma (left) and Daniel Kay of Elan Design. Behind them a Video Toaster shows off some special effects.

Quick-View Studio Integrates TV with Graphics and Text

E-Machines has begun shipping Quick-View Studio, a TV digitizing board and software that let you capture video sequences and integrate them into a document for playback during a presentation. The product also supports special effects and overlays, and can import images into multimedia applications such as MacroMind Director.

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Australopithecus

Homo Erectus

Homo Sapien



This bipedal homonid lacked the ability to remain erect for very long and relied exclusively on floppy disks – 800k was adequate storage for his limited cranial capacity.



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When you think about it, just about everything has changed in the past million or so years. We humans are now increasingly more dependent on fast and reliable storage solutions to handle most of our every day business needs.

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Circle 207 on reader service card



E-Machines' Quick-View Studio board and its software let users incorporate video sequences into documents.

Quick-View Studio comes with an impressive interface that, among other things, lets the user see up to 16 thumbnail images of sequential frames, making it easy to select the best one to incorporate in a document. The Quick-View Studio board can also save the images at different sizes and bit-depths, so the user can choose how much disk space to dedicate to a sequence.

The board supports masks and overlays on live video and can perform a variety of real-time special effects, such as rotations. For editing, it can show multiple live TV windows running from different video sources. E-Machines expects to ship an optional sound-digitizing module beginning in March. The sound module will work with the Sound Manager in System 6.0.7. Quick-View Studio is available now at a list price of $2495. For more information, contact E-Machines in Beaverton, Oregon, at 503/646-0946.—**T.M.**

At the Garage

I intended to spend an hour or so at the Garage, San Jose's new interactive science and technology museum. But five hours later they had to pry me away from a Mac that was showing movies of amphibious and airborne bicyclists traversing the seas and the skies.

Formally known as the Technology Center of Silicon Valley, the Garage takes its nickname from the humble beginnings of Valley giants like Apple and Hewlett-Packard (both have been generous contributors). Its exhibits cover microelectronics, robotics, materials science, biotechnology, CAD/CAM, and space exploration.

At the Mars Rover exhibit, you can zoom down into the red planet's valleys and up over its mountains at the touch of some HyperCard buttons—with the help of computer simulation and animation based on NASA's Viking data. You can touch more buttons to learn about Mars's geography and geology, its past and future exploration, and the possibility that there are some sort of live critters up there.

After returning from Mars, you can move on to design the bike of your dreams on a CAD system that offers choices of various aerodynamic frames, wheels, gears, and handlebars—then print your design and proceed to computer simulations of its manufacture and marketing. After that, you can watch the robots in action, walk through a real microchip production facility, experiment in a biotechnology lab, or sit down at one of many Macs in an interactive multimedia lab. At the Big Chip exhibit, you can try a few calculations on a huge chip model that lights up as bits race through its transistors.

If you visit the San Francisco Bay Area, don't miss the Garage. For more information, contact the Technology Center at 145 West San Carlos, San Jose, California, 408/279-7150.

—Ann Garrison



ROBERT HOLMGREN

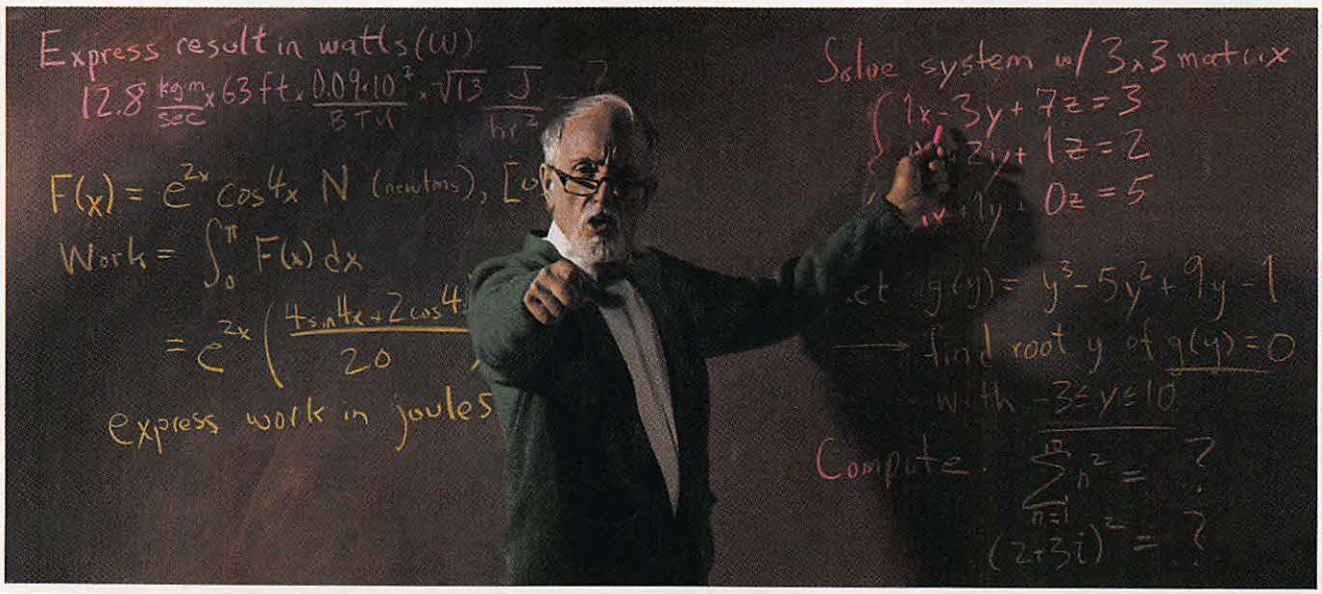
Kids at The Garage type in commands and watch The Big Chip execute them in slow motion. In the background is the Personal Particle Counting Booth and a working clean room.

Self-Sensorship in Silicon Valley

In 1975 the behavior of commune farm animals helped predict a magnitude-7 quake in China. By 1995 the Macintosh and other personal computers may help us predict—or at least learn more about—earthquake activity. Since personal computers vastly outnumber livestock in the San Francisco Bay Area, seismologist Edward Cranswick figures that volunteers from the computing community could help collect earthquake data.

(continues)

In college, you would have killed for MathCAD. So why aren't you calculating with it now?



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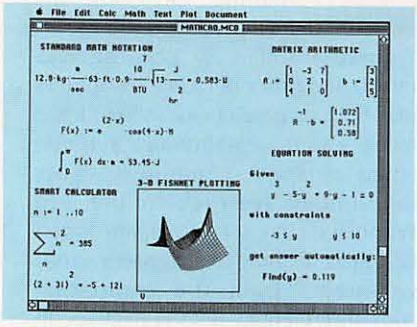


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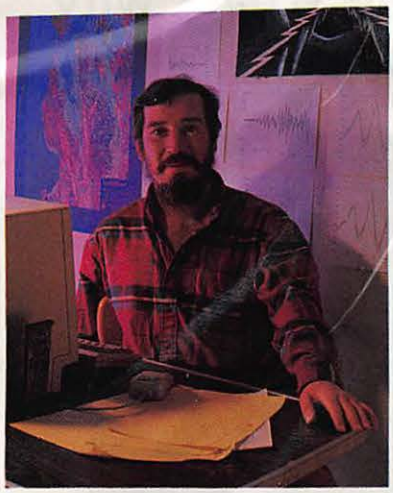
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Circle 34 on reader service card



PATRICIA BARRY LEVY

If Edward Cranswick of the USGS has his way, your backyard could become part of the People's Seismographic Array.

Cranswick, a geophysicist with the U.S. Geological Survey in Golden, Colorado, and consultant Robert Banfill have come up with a plan they call the People's Seismograph Array. In a recent meeting of the American Geophysical Union, Cranswick presented his proposal. It goes something like this. Anyone who owns a personal computer—Mac, IBM PC, or Amiga—could volunteer to set up an earthquake-monitoring system at home. The volunteer would have to pay several hundred dollars for a self-contained digital seismic data acquisition unit (SDAU). The SDAU would include a seismic activity sensor called a geophone, which would be buried in the user's yard. When a quake occurred, the unit would digitally record seismic signals and send them via a built-in modem to a USGS minicomputer located in Menlo Park, California. Seismologists could then analyze data sent in from multiple locations and augment the quake data collected through their current monitoring system.

The buried sensor would be connected not only to a modem but to the Mac's serial port as well. Information captured by the seismograph and stored in the unit's RAM could be downloaded to the computer, opened with special software, and viewed by the volunteer. (The possibility of enthusiastic amateurs mangling data would be minimal, since the SDAU's modem would automatically send data directly to the Menlo Park computer when triggered by a quake.) Included in Cranswick's plan is a user group for volunteers to share data and summarize results in a newsletter.

Will backyard seismographs be the latest rage in Silicon Valley? Maybe so. Cranswick and his colleagues successfully used personal computers to quickly analyze data recorded during the 1989 Loma Prieta quake. With its large population of computer-owning, quake-conscious citizens, the Bay Area would be the perfect place for a seismographic computing commune. For more information, contact Edward Cranswick, U.S. Geological Service, MS #966, Box 25046, Federal Center, Denver, CO 80225, 303/236-7492.

—Erfert Fenton

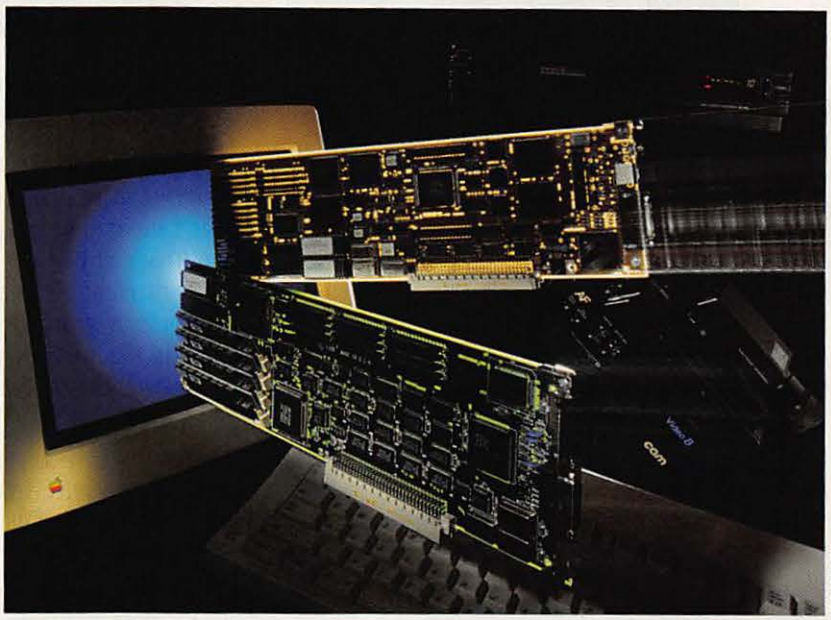
I Want My 24STV

RasterOps has introduced a series of display monitors and graphics adapters including the 24STV, a single NuBus board that can combine 24-bit color, digital television input, and graphics acceleration, with video-overlay and video-compression capabilities. The company has also unveiled the 24si, a one-board combination 24-bit color adapter and accelerator for the Macintosh IIsi.

The basic 24STV board supports Apple's 13-inch monitor and includes the frame-grabbing and video-overlay features. One optional piggybacked expansion board provides the graphics acceleration, while a second optional piggybacked expansion board provides the video compression and decompression. With the options, the 24STV board can quickly capture digitized images from NTSC, PAL, SECAM, or S-Video sources, compress them, and store them on disk. The board can also overlay live video with text or graphics for presentations. RasterOps offers XCMD and X-Object software for creating the overlays. The 24STV, slated to ship in February, has a suggested retail price of $1795. Prices had not been set at press time for the piggybacked expansion boards, which were scheduled for March availability.

The 24si, intended for the Macintosh IIsi, is a 24-bit color board that accelerates QuickDraw. The board speeds up graphics applications by as much as 600 percent, according to RasterOps. It is also designed to work with Apple's 13-inch monitor. RasterOps expected to begin shipping the 24si in February at a list price of $1095. For more information, contact RasterOps in Santa Clara, California, at 408/562-4200.**—T.M.**

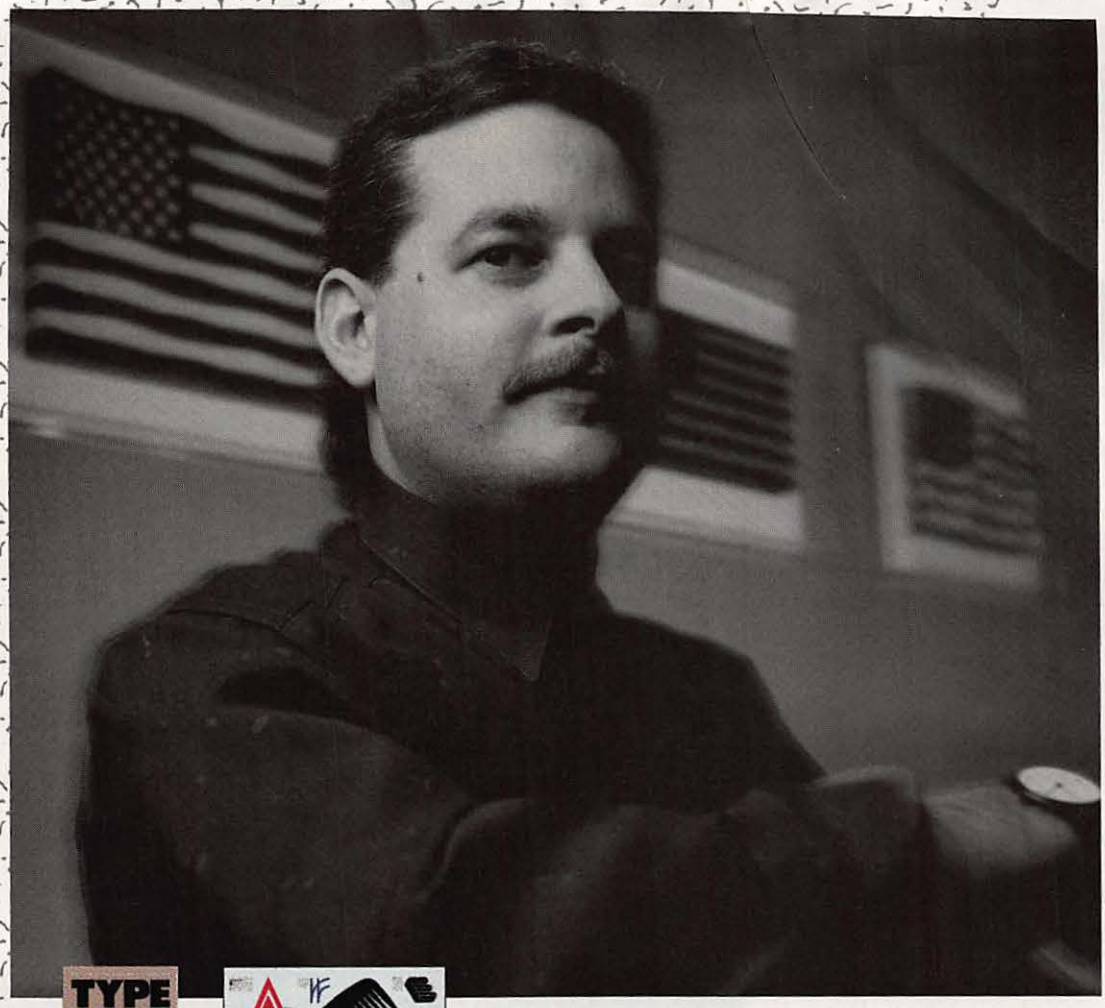
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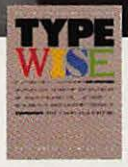


TOM GIBSON

RasterOps has unveiled the 24STV (top), which can combine 24-bit color, digital TV input, and graphics acceleration. The 24si is a 24-bit board and graphics accelerator for the IIsi.

"We're very particular about how type looks. That's why we use QuarkXPress."















Rick Binger, Computer Designer
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Pentagram is an international design partnership founded in 1972, with offices in San Francisco, London, and New York. The firm offers services in corporate communications, packaging, and environmental, exhibit, architectural, and product design.

If you're particular about type, visit your local dealer for more information.



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Women of Color–In Color

Although the list of great women writers is long, men dominate in other arts, including the visual arts. Where are the female Leonardos, Rembrandts, Van Goghs, or Picassos? How many of us can name even one? Despite the current success of a few women art stars like Jenny Holzer and Cindy Sherman, women still garner only a tiny fraction of the art world's attention and awards. Galleries, museums, and critics note women of color even less.



ROSA LAU

Artist Betty Kano and multimedia designer Dana Bass. Bass's Women Artists of Color laser disc includes work by Kano.

Dana Bass took a step toward eliminating this cultural blind spot by creating Women Artists of Color, an interactive, color videodisc database of Latina, Native American, Asian-American, and African-American women artists. The disc includes 800 still images, supporting text such as artists' biographies, and 25 minutes of performances by and interviews with artists, all accessed with a SuperCard interface.

Women Artists of Color was Bass's thesis project for a master's degree in Interdisciplinary Computer Science at Mills College. From the project's inception, Bass worked closely with Moira Roth, an art history professor at Mills and a champion of women artists of color. Most of the images on the disc are from Roth's slide collection of more than 1200 works by contemporary women artists of color.

A videodisc player and Macintosh II with Bass's work are permanently installed at the Mills College library in Oakland, California, where students and visitors can view it. The project, which was financed by an Apple Fellowship Grant, may eventually be published, but nothing is definite yet. For further information, contact Bass in Berkeley, California, at 415/527-4954.—**Ann Garrison**

The VCR Network

Multimedia is not as easy as it sounds. Few multimedia devices—laser disc players, video decks, audio mixers—can talk to each other. And even if they could, how would you drive a whole stack of devices from the Mac's two serial ports?

ARTI (Advanced Remote Technologies Incorporated) answers these questions with two product lines, one aimed at professional multimedia developers, and a new low-end line that lets amateurs into the game for about $100 per device.

The ProNode, the professional product, connects devices to ARTI's Token-Ring-like Arnet, which supports up to 200 devices. ARTI supplies drivers for about 70 common and not-so-common devices including tape decks, switchers, lighting controllers, and even hydraulic robots. After you download the appropriate drivers, ProNodes control the devices. (The $995 ProNode supersedes the earlier ARM/ARCHI system, though they can coexist on a network.) The ProNode stores drivers in static memory, so you don't have to reload them at start-up, and can generate timing characters for cuing and dubbing. The $1495 ProNode-V adds read-write Vertical Integral Time Code support.



GWENDOLYN CATES

Diane Totura of 1st National Bank of Chicago's Telemedia Services. The bank's racks of video devices run on an Arnet.

ARTI's Video Publisher version 2.0, a $695 HyperCard stack, coordinates all the devices on the Arnet and lets you access their features to do frame-accurate editing, run special-effects boxes, monitor a tape, or generate edit-decision lists. Other software, including MacroMind's Director 2.0 and MediaMaker, can also control an Arnet.

ARTI's low-end product, the MediaNode, lists for $149. You can network up to 16 MediaNodes, each with one device such as a VHS deck, Super VHS, 8mm, Hi-8, laser disc player, or other consumer-quality device. The $59 EditBuddy software supports creating clips, stringing them together, and writing them out to tape.

For more information about ARTI's products, call the company in Campbell, California, at 408/374-9044.—**D.L.**

VIRUS WATCH

Current viruses, Trojan horses, and worms affecting the Macintosh community.

nCAM

Type: Virus
First listed in Virus Watch: 5/91
Info: An nVIR clone; infects applications and system files.
Impact: Nondestructive; can cause crashes.

MDEF D

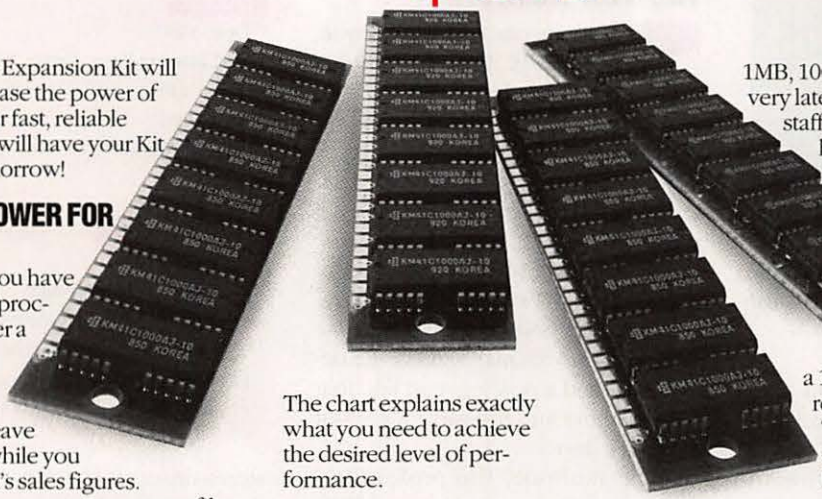
Type: Virus
First listed in Virus Watch: 5/91
Info: Infects applications and system files.
Impact: Nondestructive; can cause crashes.

MODM and zero

Type: Viruses
First listed in Virus Watch: 3/91
Info: Both nVIR B clones; infect applications and system files.
Impact: Nondestructive; can cause crashes.

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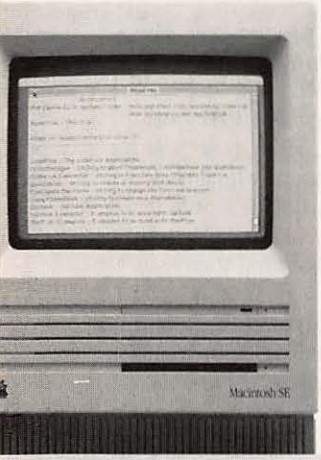
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2-1/2 MB	Remove only two 256K SIMMs, install two 1 MB SIMMs.
4 MB	Replace all four 256K SIMMs with four 1 MB SIMMs.
To upgrade an 8-socket Mac II, IIx, IIcx, oe SE 30 to this amount of memory.	**Do this: (Install in multiples of four only.)**
4 MB	Remove all four existing 256K SIMMs, install four 1 MB SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256K SIMMs, install four 1 MB in remaining sockets.
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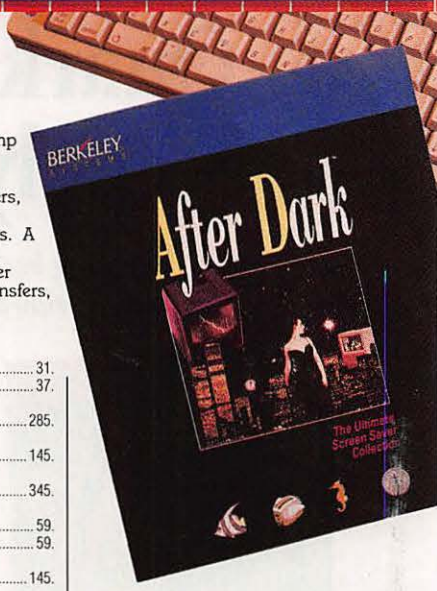
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ACC0528 Ultimate Classic Carrying Case - Navy 79.
Kensington
ACC0459 Maccessories SE Radiation Anti-Glare Filter 52.
ACC0097 System Saver Mac - Platinum 63.
Mobius Products
ACC0055 Fanny Mac QT 55.
ACC0247 SE Silencer 39.
PowerUser™
BND0013 PowerUser Carrying Case w/Free Cap 69.



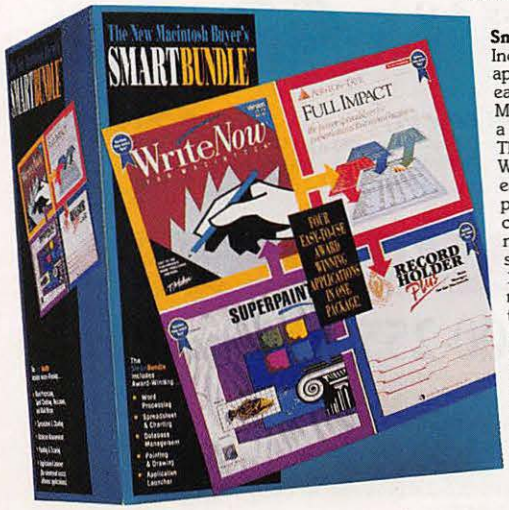
MacPro Plus (Key Tronic)
Key Tronic's new MacPro Plus keyboard is compatible with all Macintosh computers. The enhanced 105-key layout includes Period/Comma lock capability, an interchangeable Caps Lock and Ctrl keys. Also, the connecting cable you need is offered at no extra charge. The keyboard is backed by a limited lifetime warranty and unlimited toll-free product support. Includes offer for Tempo II, a keyboard macro package from Affinity Microsystems a $149.95 value FREE! **INP 0156 $145.**

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FIN0088 CheckFree 21.
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STA0008 StatView II 1.03 279.
STA0010 StatView SE+Graphics 1.03 199.
STA0022 SuperANOVA (MacII Family) 309.
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BUS0129 FastTrack Schedule 1.5 139.
DAT0055 AEC Information Manager 409.
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GRA0070 CalendarMaker 3.0 31.
Claris
DAT0064 FileMaker Pro 218.
BUS0058 MacProject II 2.1 365.
BUS0065 SmartForm Designer 289.



SmartBundle (T/Maker)
Includes four outstanding applications to make life easier, especially for new Mac owners. Each has won a MacUser Eddy Award. The word processor, WriteNow 2.2, combines ease of use with high performance (spelling checker, thesaurus, mail merge, footnotes). The spreadsheet, Full Impact 1.1, crunches your numbers and displays them in attractive charts. SuperPaint 2.0 combines drawing with a paint program, plus an AutoTrace tool. RecordHolder Plus is perfect for keeping names and addresses, invoices, and sales call records.
$215. BUS 0152

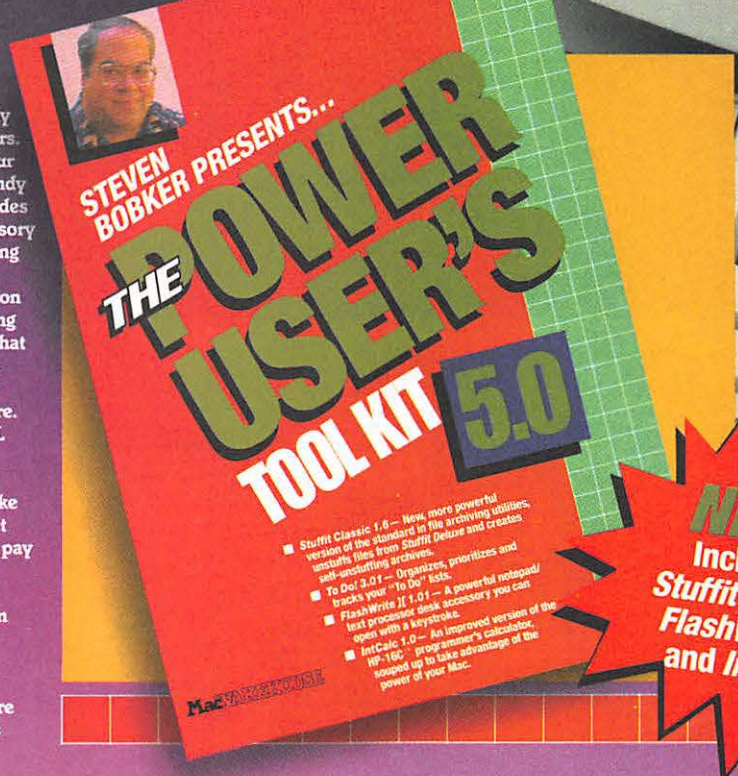


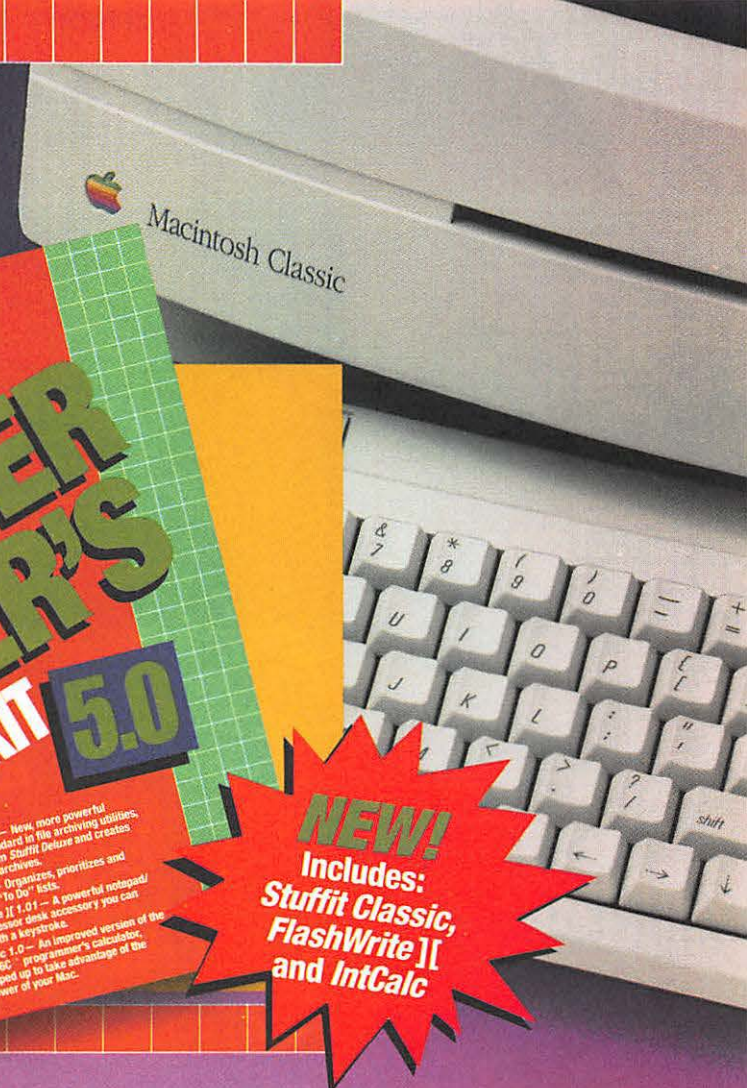
MacPlus/SE- with Extended Keyboard Carrying Case (Targus)
Pamper your Mac with a Targus case made of Zilicone treated nylon to give you waterproof durability and an impact absorbing high-density foam layer with a soft protective lining for complete protection. Cushioned shoulder pad and handles provide extra comfort and convenience. There's room for everything from your Mac including the new Macintosh Classic, a hard disk drive, and the extended keyboard to pockets for your mouse, floppies, cables, and pens. **ACC0250 $79.** Full Mac line available in black. Some styles available in blue, burgundy, and platinum. Premier Leather Case available (black) **$185. ACC 0482**

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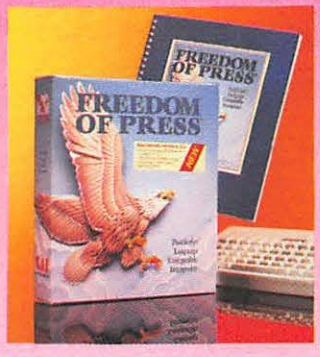


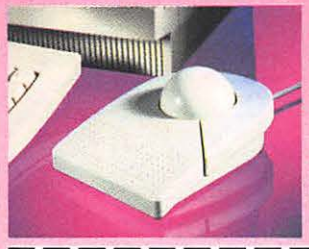
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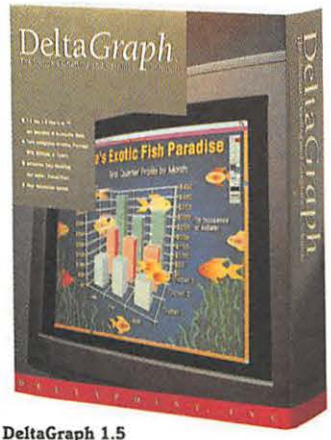
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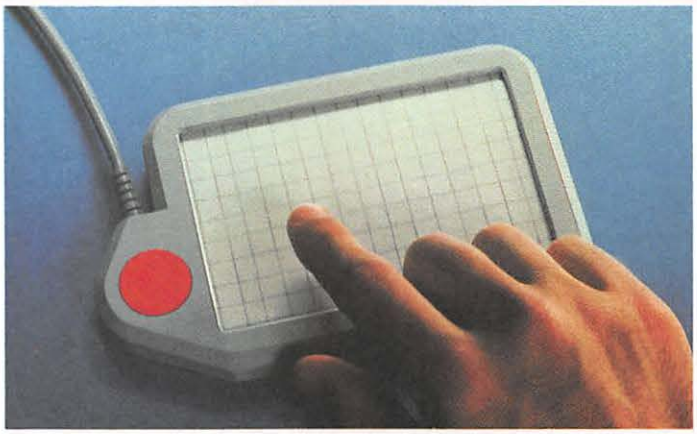


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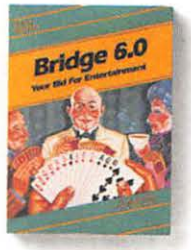
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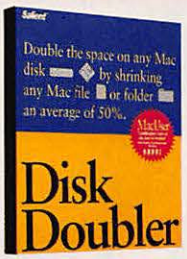
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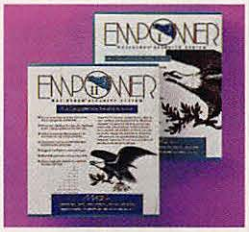
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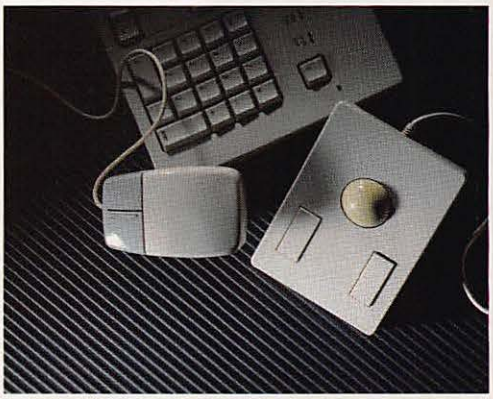
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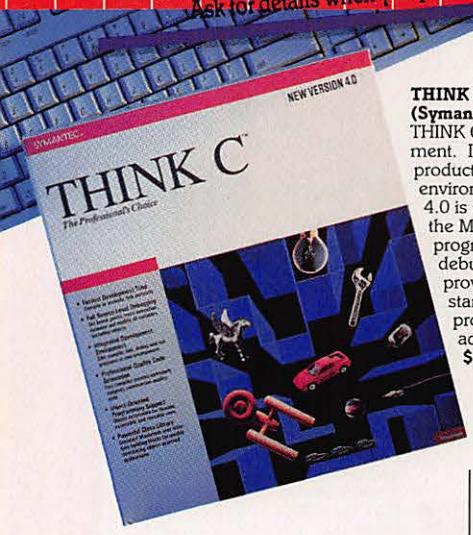
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Get precise fingertip control in a space saving, ergonomic package design. Turbo Mouse offers twice the speed and accuracy in half the space. Both Pocket Mouse and Turbo Trackball come with manufacturer's lifetime warranty. **$59**
INP 0051



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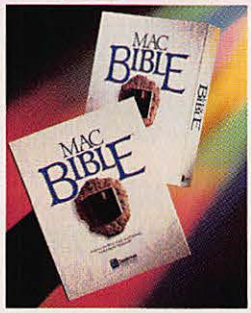


THINK C
(Symantec Corporation)
THINK C version 4.0 is the ultimate C environment. It takes programmers from idea to finished product faster than any other development environment of the Macintosh. THINK C version 4.0 is the only C development environment on the Macintosh that supports object-oriented programming, even in the source-kevek debugger. The new THINK Class Library provides the building blocks to implements a standard Macintosh user interface, so programmers can quickly leverage the advantages of object-oriented programming. **$165. LNG 0001**

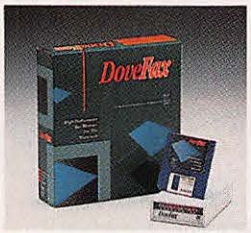
ENT0046	Fokker Triplane Flight Simulator 2.8	26.
ENT0261	P51 Mustang 2.80	36.
Centron Software, Inc.		
ENT0329	BlackJack Strategy Tester (w/ BlackJack Ace)	65.
ENT0277	Casino Master	49.
ENT0289	Casino Master Deluxe Mac II Version	55.
ENT0257	CrapsMaster	27.
ENT0264	BlackJack Ace	27.
Electronic Arts		
ENT0355	Harpoon	39.
ENT0319	Starflight	39.
Sir Tech Software, Inc.		
ENT0096	Wizardry	35.
ENT0347	Wizardry II: Knight of Diamonds	29.
Spectrum HoloByte		
	FACES, TETRIS, Welltris	ea. 25.
The Software Toolworks		
ENT0281	Chessmaster 2100	32.
ENT0278	Life & Death	32.
ENT0269	The Hunt For Red October	20.
Three-Sixty		
ENT0323	Sands of Fire	32.
Toyogo		
ENT0270	Go Master 4.7	45.
ENT0326	Nemesis Deluxe	95.
XOR Corporation		
ENT0274	MacGolf Classic	52.
ENT0330	MacSki	40.
ENT0212	NFL Challenge	55.

FONTS & APPPLICATIONS

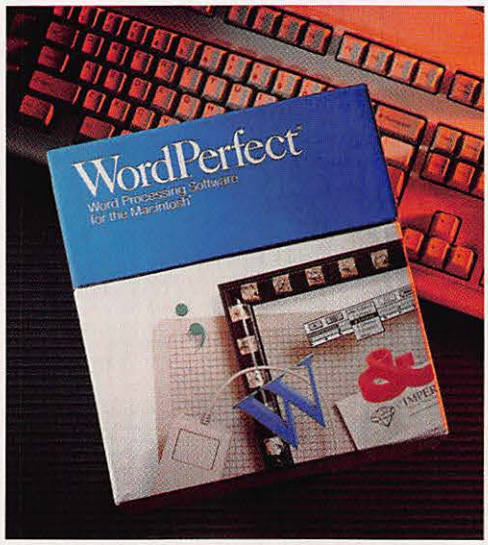
Adobe Systems, Inc.		
FON0264	Adobe Type Manager 2.0	55.
FON0351	Adobe Type On Call	NEW! 49.
	Adobe Type Set 1 or 2	ea. 65.
FON0326	Adobe Type Set 3	135.
	Smart Art I, II, III or IV	ea. 65.
DAC0028	TypeAlign	65.
FON0295	Adobe Type Reunion	38.
Altsys		
FON0183	Art Importer 2.0	89.
FON0014	Fontographer 3.2	269.
FON0284	Metamorphosis 1.5	89.
Altsys		
FON0284	Metamorphosis v. 2.0	89.
Baseline Publishing		
GRA0242	Color MacCHEESE	59.
Bright Star Tech, Inc.		
GRA0161	interFACE	249.
Claris		
CAD0029	ClarisCAD 2.0	649.
GRA0258	MacDraw II	289.
GRA0117	MacPaint 2.0	92.
Creative Software		
GRA0240	Easy Color Paint 2.0	47.
Deneba Software		
GRA0075	Canvas 2.1	189.
GRA0187	UltraPaint	125.
Dream Maker		
GRA0105	Cliptures Vol 1 Business Images	69.
GRA0124	Cliptures Vol 2 Business Images	69.
GRA0219	Cliptures Vol 3 Sports	69.
GRA0101	MacGallery (Hypercard version)	27.
GRA0102	MacGallery (MacPaint version)	27.
Electronic Arts		
GRA0106	Studio/8	189.
GRA0231	Studio/32	449.
Farallon™ Computing		
GRA0221	MediaTracks™	189.
GRA0222	MediaTracks™ Multimedia Pack	319.
Graphsoft		
CAD0024	Blueprint	219.
CAD0030	MiniCAD+ 3.0	595.
Innovative Data Design		
CAD0028	MacDraft 2.0	193.
GRA0104	Dreams 1.1	429.
Broderbund		
GRA0156	TypeStyler	119.
Dubl-Click		
FON0081	MenuFonts 3.0	31.
Pacific Data Products		
INP0138	Pacific MacPage	425.
Post Craft		
DTP0062	Effects Specialist	115.
QMS		
UTI0169	UltraScript	119.
Tactic Software		
FON0265	ArtFonts	50.



MacBible - New International Version
Revolutionize the way you study the Scriptures. Ideal for students, pastors, and scholars. Characteristics include a flexible word-and-phrase search mode, a verse mode for displaying any range of verses, and a count mode for showing statistical information about words. **$59. BOK 0020**



DoveFax Desktop
Turn your Mac into a multi-featured personal fax equipped to send and receive letters and documents anywhere in the world. DoveFax works quietly behind the scenes, automatically answers and receives faxes without interruption and redials until your fax has been sent. Combines a 9600 baud fax modem and 2400 baud data modem. **$299. MOD 0038**



WordPerfect 2.0 for the Macintosh (WordPerfect)
Taking full advantage of the Macintosh interface, WordPerfect 2.0 is easy to use and completely compatible with industry standards. Features include improved graphics handing, drawing and editing capabilities, styles, newspaper and parallel columns, macros and macro editor, borders, sort, merge, 115,000-word speller/thesaurus, search and replace and table of authorities. Other features include a Ruler with pop-up menus, Language Support and a file conversion utility that lets you transfer documents. **$299. WRD 0041**

TeleTypesetting		
FON0343	T-Script	92.
FON0357	T-Script Basic	55.

GRAPHICS & MULTIMEDIA

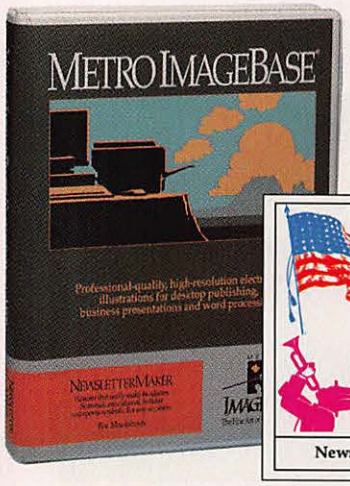
3G Graphics		
GRA0188	Images with Impact! Accents & Borders 1	65.
GRA0111	Images with Impact! Business 1	65.
GRA0089	Images with Impact! Graphics	50.
Abracadata		
CAD0032	Design Your Own Home-Architecture	65.
CAD0033	Design Your Own Home-Interiors	65.
Adobe Systems, Inc.		
DTP0054	Illustrator 3.0 (w/ ATM 2.0)	349.
GRA0125	Streamline 2.0	129.
GRA0191	PhotoShop	499.
Aldus		
GRA0264	Freehand 3.0	425.

Index Maker (Avery)
Create professional-quality customized index dividers with your Laser Printer. Enables the individual to create indexes with tab titles and graphics. Includes 5 sets of blank-tab indexes and 3 sheets of clear laser printer lables. **From $12-$18.**

Ready Index
Produce efficient indexes for better organization on heavy-duty, clear-reinforced pages with colored and numbered tabs corresponding to a colored and numbered table of contents. Just type or write on the master and use a copier machine to duplicate additionals. **From $1.50-3.00.**

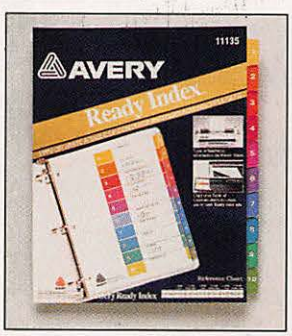


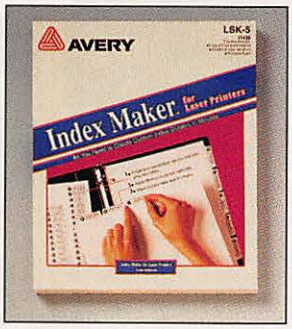
Metamorphosis Professional v. 2.0
The ultimate font conversion utility. Feature enhancements include conversion to PICT outlines, automatically hinted Truetype (Mac and PC), and PC PostScript Type 1. Also, generation of EPS and conversion of Type 3 to hinted Type 1 for use with ATM. **$89. FON 0284**




NewsletterMaker Vol.1

Electronic Clip Art (Metro ImageBase)
Communicate more effectively with fabulous art and graphics from the world's largest publisher of clip art. Each of the 18 ImageBase packages contains at least 100 topic-related images drawn by professional artists. (digitized at 300dpi or in EPS format). **$85. ea.**





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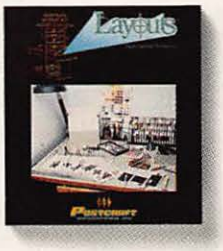
ULTRA96 With Smartcom II (Hayes)
Hayes combines the V-series ULTRA Smartmodem 9600, modem cable, transformer, telephone cable, Smartcom II and Hayes Connect software giving you the finest in high-speed, automated communications, with modem sharing capabilities over AppleTalk networks. Included is a V-series cable to allow you to go from carton to communication quickly. **$929. MOD 0059**



TouchBASE (After Hours)
TourchBASE a database to manage personal contacts It combines power, functionality and speed with the handiness of a desk accessory. Prints labels, envelopes, fax covers, address books, and reports. Provides multi-user access over a network. Furnishes powerful searching, sorting, marking and much more. Easily imports data from other products such as FileMaker, HyperCard, Microsoft Works, and Excel. **$89. DAT 0076**



MacPrint 1.2
Easy-to-use software utility that lets you use most Mac applications with any HP LaserJet, DeskJet or compatible printer including the Series III. Prints text and graphics at the printer's maximum resolution, but does not support Postscript. Cable is included. **$95. UTI 0098**

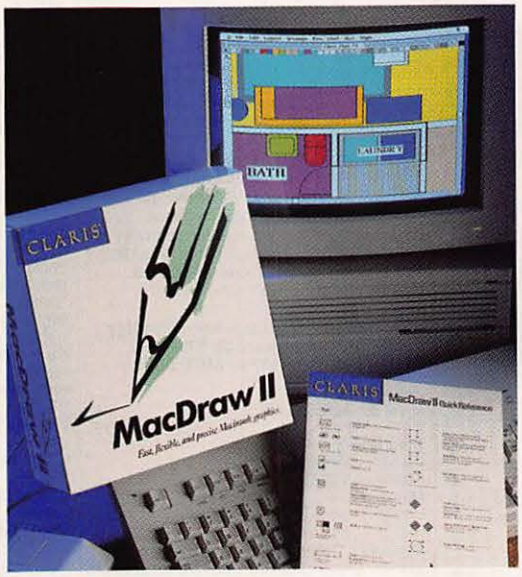


Layouts
Over 200 templates to design Newsletters, Brochures, Catalogs, Flyers, Business Stationery, and Business Reply Cards. Each one ready to use without worrying about measurements, crop marks, or registration marks. Publish magazine says "Exceptional, high recommended..." *MacUser* rated four and a half mice! **$85. DTP 0063**



Multi-Ad Search
Multi-Ad Search is a graphic utility program that allows multi-users to create, catalog, manage and manipulate Macintosh-based graphics for placement into desktop publishing programs. **$129. UTI 0199**

Letraset
GRA0151 ColorStudio 649.
DTP0019 ImageStudio 1.5 139.
MacroMind
GRA0140 MacroMind Director 2.0 519.
Metro Image Base
Full Line Available ea. 85.
Paracomp
GRA0235 FilmMaker 439.
GRA0233 Swivel 3D Professional 439.
GRA0234 SwivelArt 82.
Praxitel
UTI0211 Read My Lips 75.
Preferred Publishers
GRA0239 Master Color 99.



MacDraw II 1.1 (Claris)
Create a variety of graphics in addition to regular drawings. Use it for simple Desktop Publishing projects (fliers, invitations, business forms). Make desktop presentations. Create illustrations, logos, and maps. Or design floor plans, landscapes, and products. MacDraw II prints everything from E size documents to color 35mm slides, and generates four-color separations. Comes with FREE MacPaint 2.0 and custom clip art. FREE upgrade to MacDraw PRO. A $349 value. **GRA 0258 $298.**

GRA0238 Master Paint 51.
Silicon Beach
GRA0092 Digital Darkroom 2.0 259.
GRA0131 Super 3D 2.1 339.
HYP0027 SuperCard 1.5 199.
GRA0112 SuperPaint 2.0 135.
Solutions, Inc.
DAC0002 SmartScrap & The Clipper 2.01 56.
Strata
GRA0176 StrataVision 3D 375.
Strategic Mapping, Inc.
GRA0227 Atlas MapMaker 4.5 369.
Studiotronics
GRA0189 Colorset 1.5 229.
SuperMac
GRA0109 PixelPaint 2.0 225.
GRA0249 PixelPaint Professional 2.0 465.
T/Maker Co.
GRA0209 ClickArt Business Cartoon 33.
GRA0039 ClickArt Business Image 32.
GRA0088 ClickArt EPS Illustrations 82.
Zedcor
GRA0199 DeskPaint 3.3 115.

HARDWARE & PERIPHERALS

Caere
INP0143 Typist 479.
CoStar
INP0091 LabelWriter 185.
Hewlett Packard
INP0096 HP DeskWriter - 2279A 759.
MegaGraphics
MON0015 8-bit 19" Hi-Res Greyscale for Mac II ... 1895.
MON0016 8-bit 19" Hi-Res Greyscale for SE/030 . 1899.
MON0006 Rival System for Mac II 1199.
MON0008 Rival System for Mac SE 1199.
MON0007 Rival System for Mac SE/30 1199.
Seikosha
INP0041 Seikosha SP 2000 AP Printer 235.
Sharp
COMP007 Wizard OZ 7000 (32KRam) 229.
COMP018 Wizard OZ 7200 (64KRam) 255.
ThunderWare
INP0116 LightningScan 400 385.
INP0007 ThunderScan Plus 199.

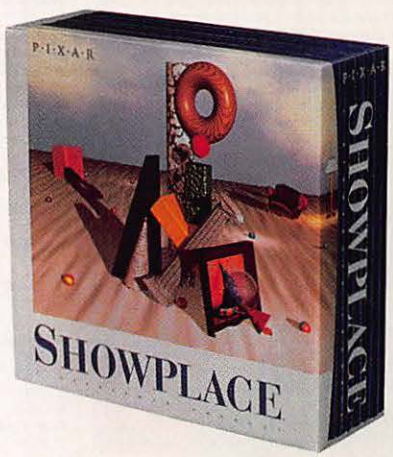
INPUT & OUTPUT

Abaton
INP0157 Scan 300/Color 1899.
INP0130 LaserScript Printer 1999.
Asher Engineering
INP0051 QuadLynx Trackball ADB(SE/II) 59.
INP0158 Pocket Mouse 49.
Calcomp
INP0102 The Wiz Pen 57.
INP0098 The Wiz Tablet 159.
CH Products
INP0121 RollerMouse ADB 75.
Curtis
INP0141 MVP Mouse 89.
Datadesk International
INP0097 DataDesk Switchboard 159.
INP0047 Mac 101 Keyboard SE/II 129.
Digital Vision, Inc.
GRA0145 Computer Eyes B & W 199.
GRA0154 Computer Eyes For Mac-Color 349.
ICD
INP0095 Grafiex 82.
Kensington
NP0059 Turbo Mouse 109.
INP0060 Turbo Mouse ADB (SE or II) 109.
Key Tronic
INP0156 MacPro Plus 145.
Koala
INP0127 MacVision 3.0 269.
Kraft
INP0094 Kraft ADB Trackball 79.
Kurta
INP0113 IS/ADB Tablet 8 1/2 x 11 319.
INP0114 IS/ADB Tablet 12 x 12 385.
INP0115 IS/ADB Tablet 12 x 17 625.
Microspeed
NP0126 MacTRAC ADB 75.
INP0140 MacTRAC DB9 62.
MicroTouch
INP0084 The UnMouse 189.
Mouse Systems
INP0132 Little Mouse ADB 75.
INP0134 Trackball / ADB 69.
Sophisticated Circuits
ACC0535 Power Key 65.

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1 MEG SIMMs Low profile, 100ns, High Quality 59.
Daystar Digital
DRI0224 FastCache IIci 289.
DRI0288 PowerCache - 40 MHz (IIci) 979.

Showplace (Pixar)
Showplace is a 3D sketchpad for making amazing RenderMan color pictures. With a few mouse strokes you call up ClipObjects (or create your own), arrange them into scenes, give them rich material appearances (Looks), light them, then "render" them into a great image. Your own graphics can also be wrapped onto any objecct for effects impossible in 2D. Works with (but does not require) MacRenderMan for print-quality computer graphics. **GRA 0267 $529**



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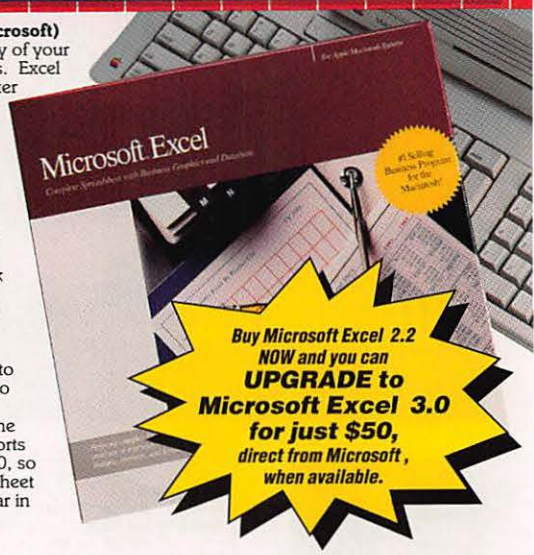
GUARANTEE

Many of our products come with a thirty day money back guarantee, if you are not completely satisfied. Ask for details when you place your order.



TelePort, the ADB Modem (Global Village Communication)
The perfect choice for powerful yet compact Mac communication. This 2400 baud modem with MNP5 data compression packs Hayes compatibility and error-free communication. TelePort plugs into your mouse (ADB) port and provides a pass-through connector for other devices. It uses no external power supply, and leaves your serial port free for other uses! **MOD0049 $145.**
TelePortFAX includes SendFAX software. Hold OPTION as you drag FILE-PRINT to easily send FAXes worldwide **MOD0058 $189.**

Microsoft Excel 2.2 (Microsoft)
Now use the full memory of your Mac—up to 8 Megabytes. Excel 2.2 recalculates 40% faster while empty cells consume no memory at all. Cell annotation lets you add notes to any cell and auditing functions help you trace cell references. The new Search and Replace function makes global changes. Just doubleclick anywhere on a chart to see the dialog box for all the chartformatting commands. Charts are now dynamically linked to the original worksheet, so the chart automatically reflects any changes in the spreadsheet. Also supports "warm links" to Word 4.0, so changes to your spreadsheet data automatically appear in your Word documents.
$245. BUS 0003

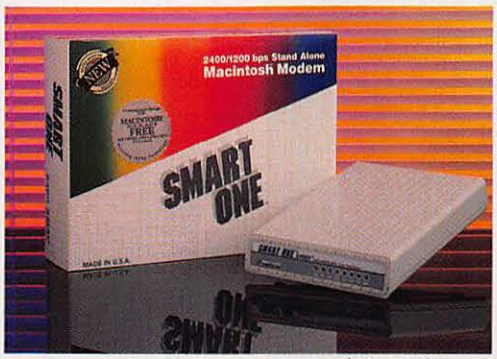


DRI0290	PowerCache - 50 MHz (IIci)	1699.
	PowerCard 030	starting at 1495.
Connectix		
UTI0144	Virtual 030 UM3	115.
DRI0185	Virtual 2.0 PMMU	188.
Dove		
DRI0130	MaraThon 030 (MacII) w/Virtual	529.
DRI0198	MaraThon 030 - (Mac SE) w/ Virtual	529.
DRI0197	MaraThon 030 - (MacPlus) w/Virtual	529.
DRI0152	MaraThon 030X (MacIIx) w/ Virtual	529.
DRI0151	MaraThon 030-SE/030 w/ Virtual	529.
Micron Technology		
DRI0321	PicturePress Card (Xceed ICDP-II)	745.
MicroTech International, Inc.		
CHP0025	Mac Classic 1 Meg Upgrade	99.
CHP0026	Mac Classic 3 Meg Upgrade	175.
DRI0315	Mac Classic Upgrade Kit 20-1	399.
DRI0317	Mac Classic Upgrade Kit 40-1	499.
DRI0318	Mac Classic Upgrade Kit 40-3	575.
PowerUser		
CHP0013	1 Meg Simm 100ns PowerUser	59.
Total Systems		
DRI0295	Mercury 16MHz 68030 - Plus	499.
DRI0297	Mercury 16MHz 68030 - SE	389.
DRI0299	Mercury SCSI Module - Plus	189.
Gemini- Full Line Available		
DRI0301	Gemini 20 MHZ Card	799.
DRI0302	Gemini 25 MHZ Card	999.
DRI0265	Gemini Plus Kit	129.

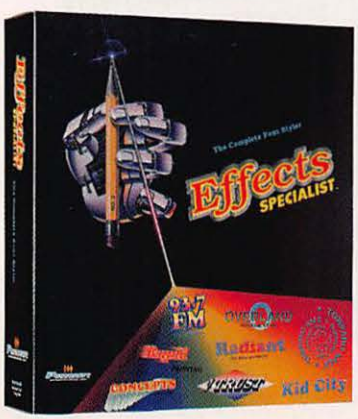
MODEMS & FAX

Abaton		
MOD0019	InterFax 12/48	265.
MOD0034	InterFax 24/90	349.
Applied Engineering		
MOD0054	DataLink/Mac	209.
Best Data Products		
MOD0021	SmartOne 2400/1200	139.
Dove		
MOD0038	DoveFax Desktop	299.
Global Village		
MOD0049	TelePort	145.
MOD0058	TelePort/Fax 9600	189.
Hayes		
COM0023	Smartmodem 2400	349.
MOD0017	Smartmodem 9600 (V series)	699.
MOD0060	Personal Modem 2400 w/Smartcom II	179.

SmartOne 2400/1200 (Best Data Products)
When you need a 2400 baud modem, the SmartOne 2400/1200 provides an economical alternative. For less than the cost of some 1200 bps units, you get a Hayes compatible modem with auto answer/originate, 300, 1200, and 2400 baud operation, pass-through phone jack, speaker with programmable volume, and a manufacturer's two-year warranty. All user options are stored in non-volatile memory. Includes free Quicklink II communications software, modem, cable, and **CompuServe/Prodigy Start-Up Kit offer. $139. MOD 0021**



Effects Specialist (Postcraft)
Transforms any font in your system into sparkling headlines or logos. Just type in a word or two and click the mouse to create instant typographical art! Features include WYSIWYG, color, kerning, a complete background generator and more! 120 effects range from subtly elegant to ultra flamboyant. Imports and exports as PICT or EPSF. Use with your favorite desktop publishing, graphics, or multimedia software. Prints to virtually any printer! **$115 DTP 0062**



MOD0059	Ultra 96 w/ Smartcom II	929.
Microcom		
MOD0050	MacModem V.32 / 9600	689.
PowerUser™		
MOD0043	PowerUser 2400	99.
MOD0047	PowerUser Mini Send Fax 2400/9600	149.
MOD0051	PowerUser Send/Receive Fax Modem 2400/9600	279.
Prometheus		
MOD0046	24/96 MSR	309.
MOD0052	9600M Plus Modem	699.
MOD0033	Promodem 2400 MFax	209.
MOD0035	TravelModem	199.
Shiva		
NET0067	NetModem V.32 (9600)	1169.
Supra Corporation		
MOD0020	SupraModem 2400	119.

MUSIC & SOUND

Altech Systems		
MUS0032	ALTECH MIDI Interface	59.
Coda Music Software		
MUS0044	Finale 2.5	549.
Electronic Arts		
MUS0004	Deluxe Music Construction 2.5	85.
Farallon™ Computing		
MUS0036	MacRecorder® 2.0	159.
Opcode Systems		
MUS0083	MIDI Translator	43.
Tactic Software		
	Sound Clips Vol. 1, 2, 3 & 4	ea. 50.

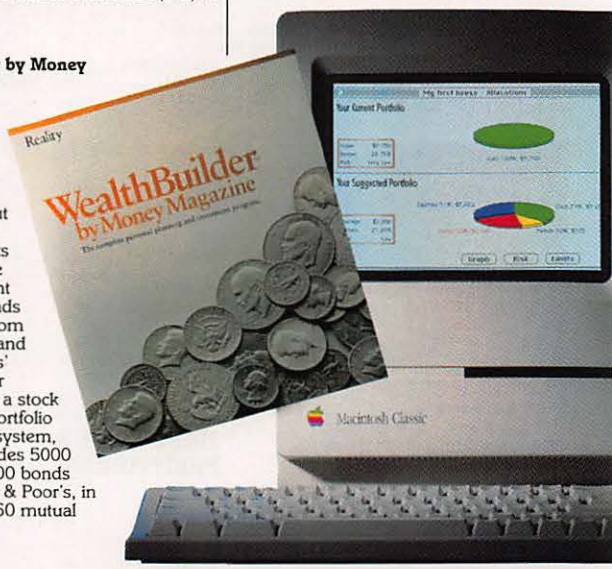
SECURITY & VIRUS PROTECTION

ASD Software, Inc.		
UTI0135	FileGuard 2.5	139.
UTI0130	FileGuard 2.5 - Office Pack 5	349.
UTI0131	FileGuard 2.5 - Office Pack 10	579.
ACC0539	MaccessCard Reader	319.
Fifth Generation System		
UTI0120	DiskLock	118.
Kensington		
ACC0235	Apple Security Kit	34.
	PassProof	70.
Kent Marsh		
UTI0028	MacSafe II	107.
UTI0064	NightWatch 1.03	86.
Microcom		
UTI0093	Virex 2.9	59.
UTI0150	Virex 10-pack	359.
Symantec Corporation		
UTI0149	Symantec Antivirus for the Mac 2.0 (SAM)	67.

UTILITIES & PROGRAMMING

Abbott Systems, Inc.		
UTI0113	CanOpener	64.
Aladdin Systems		
UTI0145	StuffIt Deluxe	63.
ALSoft		
UTI0132	DiskExpress II 2.04 w/MultiDisk	57.
UTI0110	MasterJuggler 1.5	57.
American Power Conversion		
UTI0133	Power Chute	69.
Baseline Publishing		
UTI0187	INIT Manager	35.
Berkeley System Design		
UTI0119	After Dark 2.0	24.
CE Software		
UTI0188	Quickeys 2 v.2	99.
Connectix		
UTI0148	HandOff II	57.
Custom Applications		
UTI0136	Freedom of Press 3.0	255.
UTI0185	Freedom of Press Light 3.0	56.
Dantz Development		
UTI0118	Retrospect	148.
Digitalk, Inc.		
LNG0036	Smalltalk/V MAC	125.
Dubl-Click		
UTI0194	ClickChange	41.
Fifth Generation Systems		
UTI0063	FastBack II 2.5	125.
UTI0087	SuitCase II 1.2	49.
UTI0035	SuperLaserSpool 2.02-Single User	93.
ICOM Simulations, Inc.		
UTI0084	On Cue	35.
Insight Developement		
UTI0098	MacPrint 1.2	95.
Magic Software		
UTI0077	Autosave II	28.

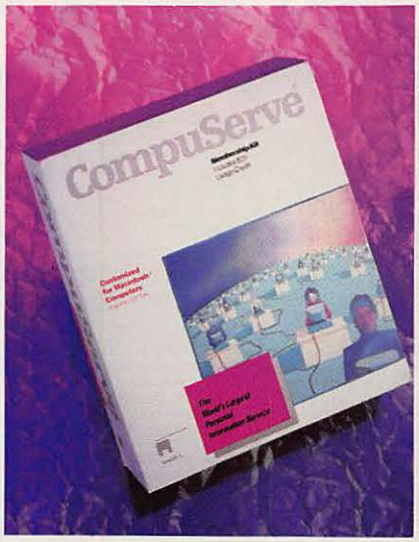
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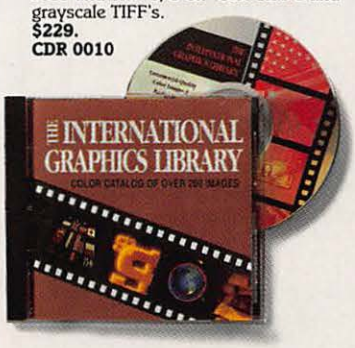
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Preferred Publishers
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UTI0183 ScreenShot 31.
Salient
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LNG0037 Inside Out 369.
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UTI0207 Offline 51.
Symantec Corporation
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UTI0078 Symantec Utilities for Mac II (SUM) 99.
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RightSoft
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Sensible Software
WRD0023 BookEnds 1.2 51.
SPL0018 Sensible Grammar 51.
SNA, Inc.
WRD0033 Stylist 51.
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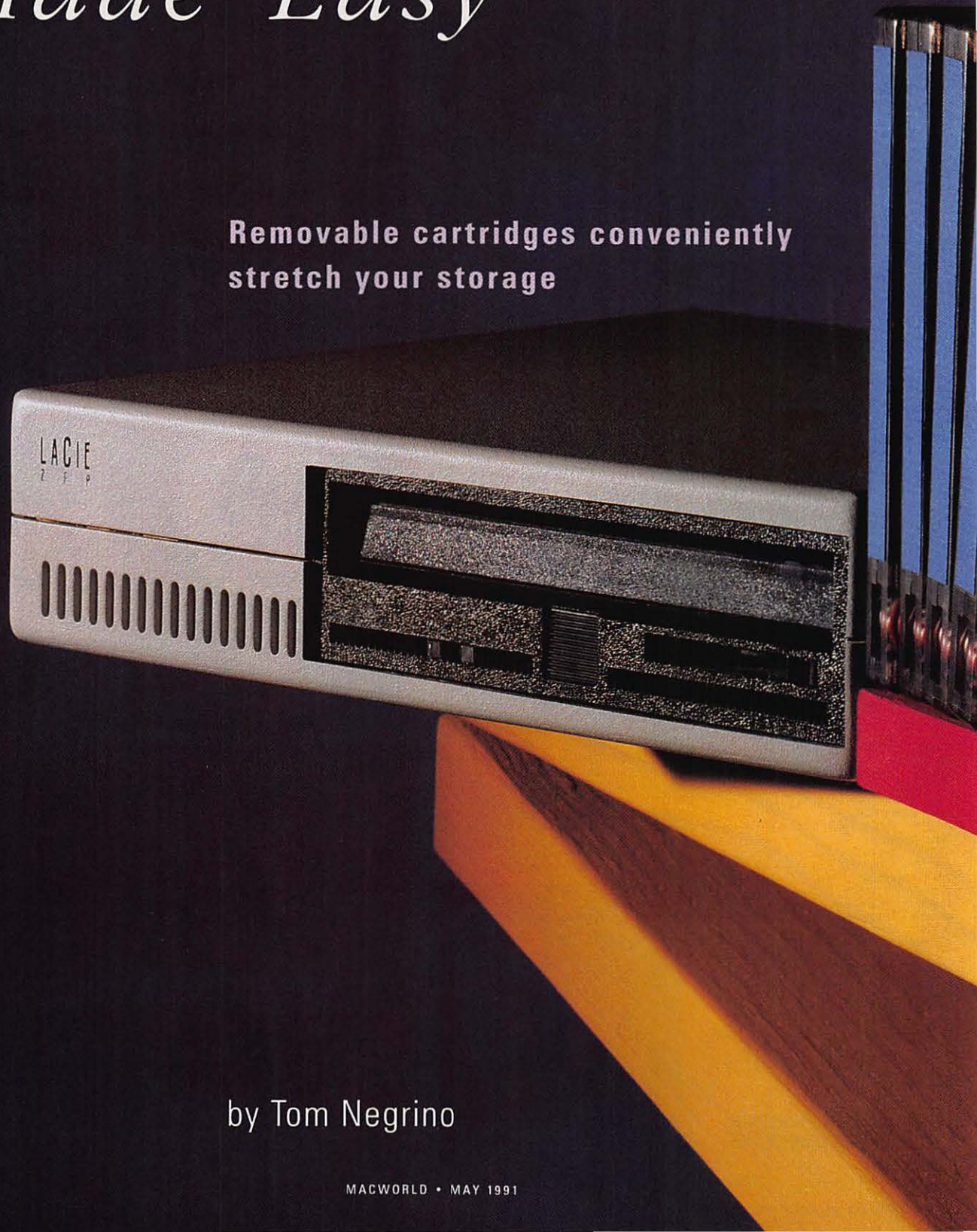
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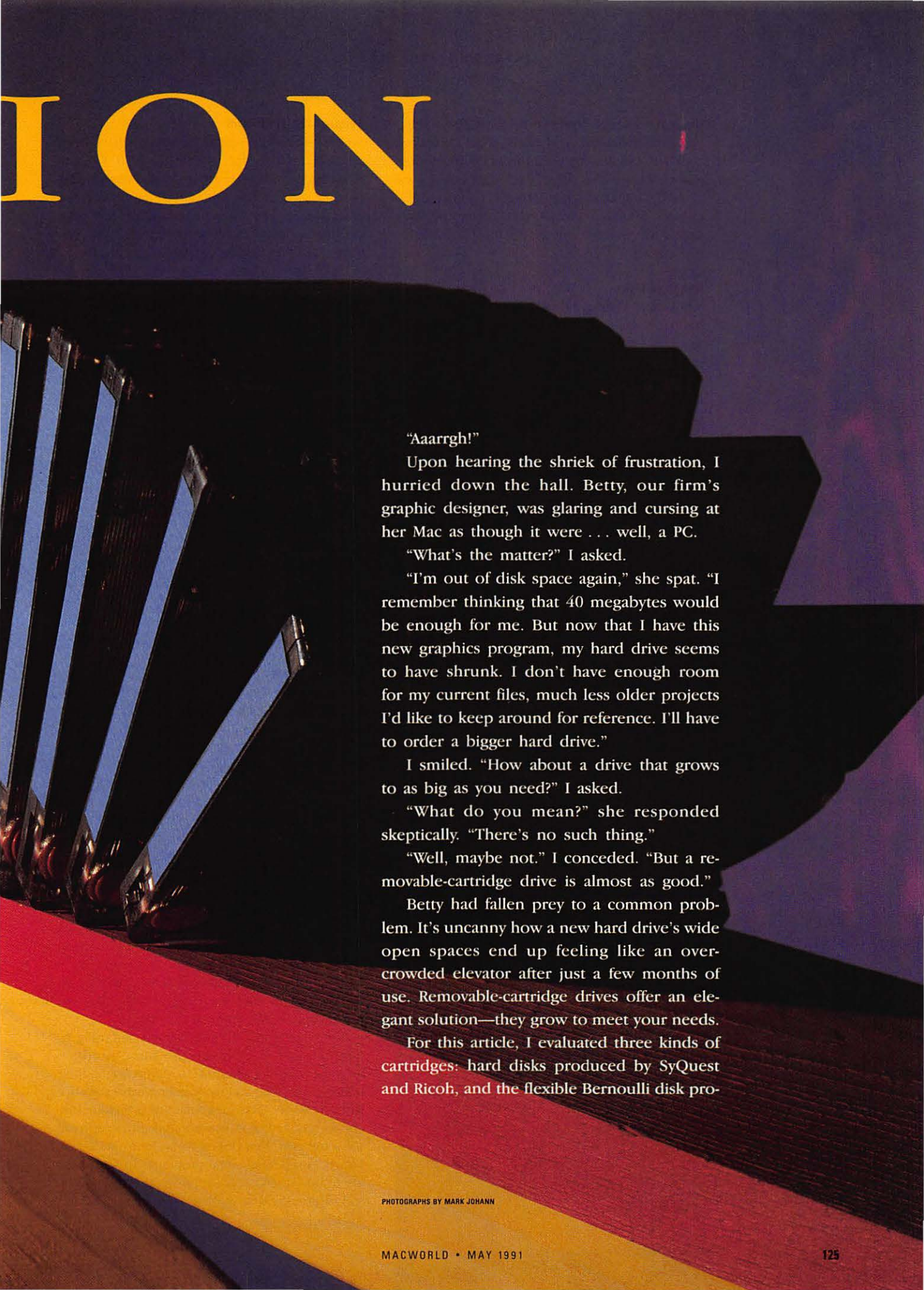
Made Easy

Removable cartridges conveniently stretch your storage



by Tom Negrino

ION



"Aaarrgh!"

Upon hearing the shriek of frustration, I hurried down the hall. Betty, our firm's graphic designer, was glaring and cursing at her Mac as though it were . . . well, a PC.

"What's the matter?" I asked.

"I'm out of disk space again," she spat. "I remember thinking that 40 megabytes would be enough for me. But now that I have this new graphics program, my hard drive seems to have shrunk. I don't have enough room for my current files, much less older projects I'd like to keep around for reference. I'll have to order a bigger hard drive."

I smiled. "How about a drive that grows to as big as you need?" I asked.

"What do you mean?" she responded skeptically. "There's no such thing."

"Well, maybe not." I conceded. "But a removable-cartridge drive is almost as good."

Betty had fallen prey to a common problem. It's uncanny how a new hard drive's wide open spaces end up feeling like an overcrowded elevator after just a few months of use. Removable-cartridge drives offer an elegant solution—they grow to meet your needs.

For this article, I evaluated three kinds of cartridges: hard disks produced by SyQuest and Ricoh, and the flexible Bernoulli disk pro-

PHOTOGRAPHS BY MARK JOHANN

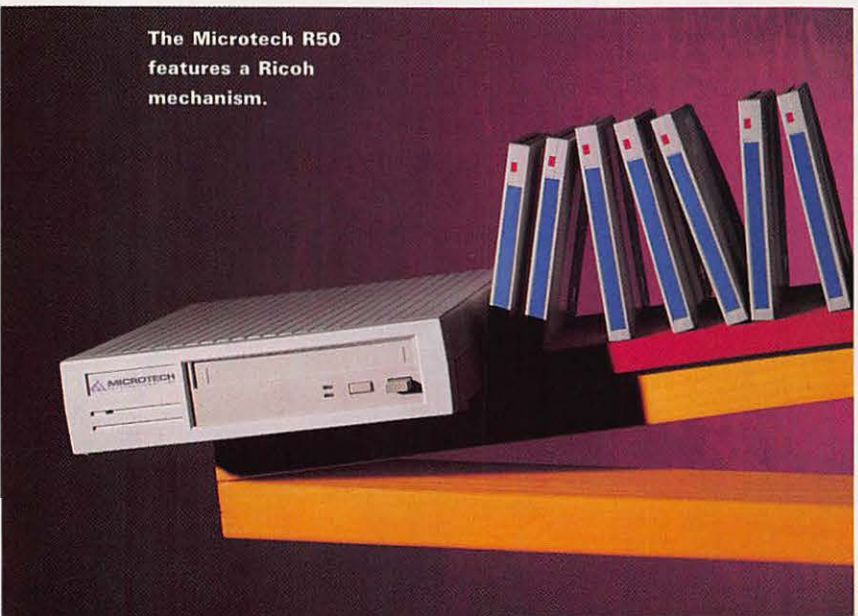
duced by Iomega. I judged them on speed, convenience, reliability, and price; and I compared software bundling by the more than 30 vendors who package the three cartridge types (see "Removable-Cartridge Drives Compared"). Overall, SyQuest drives—which offer the least expensive choices—proved the most sensible for most users.

Range of Uses

Removable-cartridge drives offer virtually unlimited storage capacity; when you fill a cartridge, which holds 40MB to 50MB, simply eject it and put in a new one. These drives serve well as primary storage, since the Mac can boot from them and they are almost as fast as fixed hard drives. Like removable hard drives, cartridges can also serve as auxiliary storage or backup devices (see "Hard Drives to Go"). Although tape drives cost less per megabyte, cartridges store and access data much faster than do tape drives. Moreover, cartridge drives eliminate the extra step of restoring data from tape to the hard drive. Because cartridges can be mounted on the desktop, they make it easy to access archival data that you need to refer to occasionally but don't want cluttering up your main hard drive.

You can use floppies for archiving, of course, but consider that 1 cartridge holds as much data as 54 floppies with 800K capacity. Cartridges are much faster, more convenient, and more compact than floppies. With a cartridge drive, you may actually back up your main hard drive regularly, the way you keep meaning to do.

Some users set up separate cartridges for various categories of work; say, one cartridge for accounting, another for graphics, a third for a database. Still another way of using these units would be to let people who share a single Macintosh each maintain their own private cartridge, set up with the INITs, fonts, and programs that they prefer.



The Microtech R50 features a Ricoh mechanism.

SyQuest the Trailblazer

SyQuest removable-cartridge systems have been available for the Mac since early 1988. Custom Memory Systems (now defunct) and Mass Microsystems (which has prospered) pioneered the units. More than a dozen manufacturers now offer the drives, but all of these mechanisms and cartridges are supplied by SyQuest.

The systems come in two parts. The removable cartridge consists of a plastic shell that protects a hard platter (see "Mechanical Variations"). You can write-protect a cartridge by turning the red tab on the bottom of the cartridge. The drive has Ready and Access lights on the front panel.

To eject a cartridge, drag its icon to the Trash to unmount it from the desktop, then press the square stop button on the drive, which causes the cartridge to spin down and stop. Finally, move the load lever to the right, and the cartridge pops out. It takes about 10 seconds to spin down and eject a cartridge, and about 20 seconds to insert and mount it on the desktop.

A formatted SyQuest cartridge holds 42.2MB, and its speed, while not blazing, is more than adequate. The drives showed an access time of 24ms, only slightly slower than the Quantum 40MB hard drive that Apple ships in SE/30 and IIci machines. Compatibility between SyQuest drives supplied by different vendors is excellent.

Setting the Pace

SyQuest drives have become a de facto standard for removable storage, especially in the graphics arena. Since desktop publishing and color graphics files can easily grow larger than 10MB, many designers and service bureaus have turned to SyQuest drives as a convenient way to shuttle huge files between the desktop and the Linotronic. But some users, such as multimedia mavens or those who generate giant QuarkXPress files with color photos, may create files too large to fit on the 42MB SyQuest cartridges. These folks have to resort to optical drives, or just haul their hard drives downtown. As *Macworld* went to press, however, PLI, Mass Microsystems, and MicroNet had just announced 88MB versions of the SyQuest drive—large enough to store most multimedia or graphics files. Those drives, which should be shipping by the time you read this, will read, but not write to 45MB SyQuest cartridges.

With so many manufacturers competing to deliver what is basically the same product, SyQuest vendors attempt to differentiate their offerings by price and by bundling extra software with the drives. Many manufacturers include several megabytes of shareware and public-domain software with their drives. As with any such potpourri, you'll trash some programs and find others to be occasionally useful—and some will be software gems that become your regular tools.

PLI includes a backup program, a print spooler, a disk optimizer, a disk-caching utility, a virus killer, and Casady & Greene's A.M.E. security software. La Cie provides an extensive bundle, including its excellent Silverlining formatting and partitioning software; Silverserver, which lets you share modems or other serial devices over a network; virus killers; demo versions of several commercial packages; and The Norton Utilities.

Undependable?

SyQuest has come under fire for producing unreliable products. The claims center around cartridges' contamination by dust, and mechanism failures. In a standard hard drive, the platter and heads are sealed in an airtight chassis. Because the SyQuest cartridge must open its shutter inside the drive to admit the read-write heads, dust can enter the cartridge and cause bad sectors, read and write errors, and even head crashes. Not surprisingly, SyQuest dependability falls short of that of fixed hard drives.

One high-volume vendor told me that his company's field-failure rates for SyQuest drives are more than double the rate for Quantum fixed hard drives. SyQuest cartridge field-failure rates are higher still, he said. His company tests each SyQuest drive and cartridge—not just a statistical sample—before it goes out the door, and such testing prevents many failed drives and cartridges from reaching customers.

Several other vendors argue that careful attention to design, use of proper components (especially the power supply), and thorough quality-control usually keep SyQuest drive field-failure rates well within acceptable standards. But vendors that don't test every drive probably see a higher percentage return for repairs. Before you buy a particular brand of SyQuest drive, ask about the vendor's testing procedures.

When a SyQuest cartridge fails, it tends to accumulate a rapidly increasing number of errors. Signs that a cartridge is going bad include read or write errors when copying files, a high-pitched squeal, and trouble mounting the cartridge. When this happens, back up the cartridge if you can, and reformat it as soon as possible. In extreme cases, the cartridge may need to be replaced.

Prices for SyQuest units vary widely, from $439 charged by MacLand to $1399 for the Rodime drives. Each company uses the same mechanisms and cartridges. An obvious choice?

There are several reasons to consider paying more than the lowest price you can find. You may be more comfortable dealing with a local computer store that carries only a more expensive drive. And you may want to evaluate the amount and type of software provided. If purchased as separate programs, some software bundles cost more than $500, so paying $100 more for a drive with an extensive bundle is often worth it.

If you have no need for extra software and no requirement for local support, then price is a good guide—as long as you feel confident that the manufacturer pretests its drives.

The Ricoh Entry

Ricoh cartridges are the newest contender for the hearts and dollars of Mac users, having appeared on the market only within the past year. These units, now offered by GCC Technologies, Microtech International, Sumo Systems, and Univation, resemble the SyQuest drives in that they also use a removable hard disk cartridge.

HIGH-DENSITY FLOPPIES: WHERE ARE YOU?

A few years ago Jasmine introduced the MegaFloppy, a 10MB (and later 20MB) drive based on a 5¼-inch Kodak floppy disk. Its sluggishness and media reliability problems suggest why Jasmine pulled the product off the market.

Insite Peripherals takes a different approach with a new technology, the *floptical* drive. This is a standard 3½-inch high-density floppy disk with optical-servo tracks embedded into the disk by a laser. Precision spacing of these tracks allows 20MB to be stuffed on the floppy—25 times as much as on a standard floppy.

The Insite drive will also read and write the lower-capacity Macintosh 800K and 1.4MB floppy formats, as well as the DOS 720K and 1.44MB sizes. As a SCSI device, the Insite floptical will hook up to the Mac easily, and the individual disks are expected to cost only about $10.

So where can you get one? As *Macworld* goes to press, you can't. Insite is currently marketing its product to system integrators who will package the drive. An Insite floptical will probably hit the market sometime this spring, in the $750 price range.

THE PRICE OF EXPANSION

Media Type	Formatted Capacity	Best Retail Price per Cartridge	Best Street Price per Cartridge	Best Retail Price per MB	Best Street Price per MB
SyQuest	42.2MB	$68.00	$69.00	$1.61	$1.64
Bernoulli	42.8MB	$140.00	$86.00	$3.27	$2.01
Ricoh	46.7MB	$125.00	$125.00	$2.68	$2.68
HD Floppy Disk	1.4MB	$4.52	$1.40	$3.23	$1.00

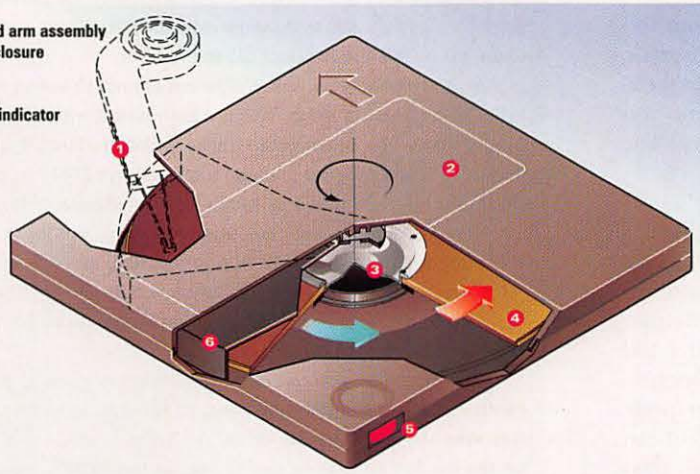
Because expandability represents a chief virtue of removable-cartridge drives, it's important to consider the cost of each technology in the long run. Let's say that you have a 40MB internal hard drive in your Mac, and that you buy a cartridge drive and use it for all three of its main functions: expanded storage, backup, and archiving rarely used data. You need three cartridges. The mail-order ads in the back pages of *Macworld* generally offer the best prices on media, and all three cartridge types are readily available.

A drive typically comes with one cartridge, so for two more cartridges, you would pay $136 for SyQuest, $258 for Bernoulli (actually, you can't buy single cartridges, only three-packs, so you're getting an extra here), and $250 for two extra Ricoh cartridges. The Ricoh product is by far the most expensive, at street price, per cartridge and per megabyte; SyQuest is the least costly.

Mechanical Variations

SyQuest

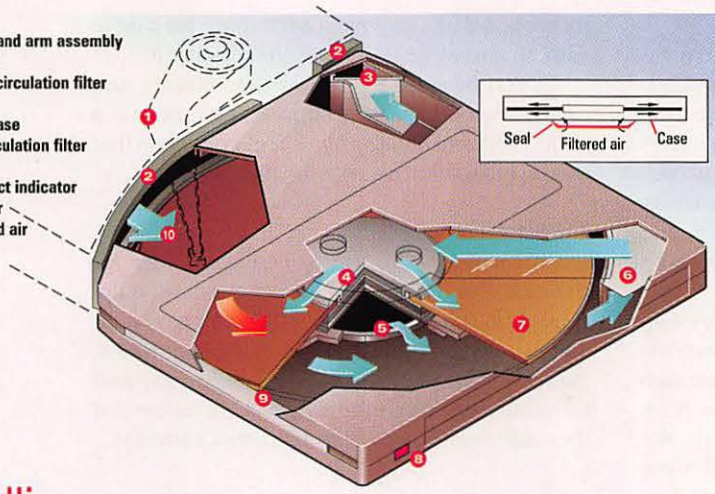
1) Drive head and arm assembly
2) Protective enclosure
3) Hub
4) Medium
5) Write-protect indicator
6) Dust cover



The SyQuest cartridge has the most basic design of the three types of removable cartridges. The rigid-medium platter is surrounded by a simple plastic case and connected to a lightweight metal hub. A single, spring-loaded dust cover protects the medium from contamination while outside the drive, and opens to reveal the platter to the drive head when the cartridge is fully enclosed by the drive during operation. There are no air filters or seals to guard against incidental contamination while inside the drive. The head sweeps across the disk in the manner of a record player's tonearm and stylus, directly contacting both sides of the medium to read and write.

Ricoh

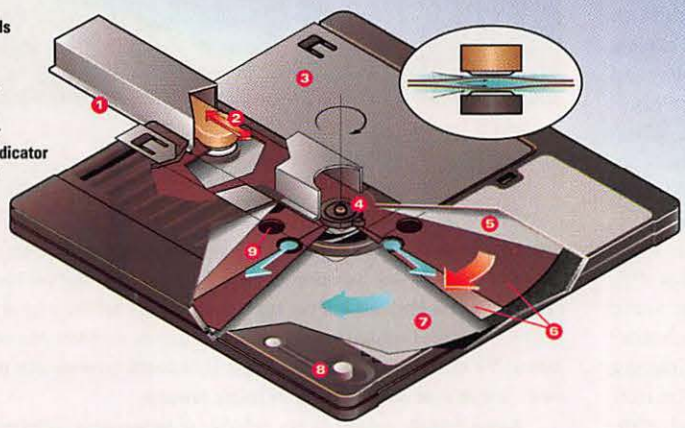
1) Drive head and arm assembly
2) Foam seals
3) Secondary circulation filter
4) Hub
5) Magnetic base
6) Primary circulation filter
7) Medium
8) Write-protect indicator
9) Dust shutter
10) Recirculated air



The more complex Ricoh cartridge uses multiple air filters and seals to prevent contamination that can cause disk or head crashes. An air-flow system clears dust away from the platter. As with the SyQuest cartridge, the read-write head directly contacts both sides of the rigid medium in a sweeping motion. The sturdier Ricoh cartridge features a heavy, balanced platter hub, positioned on a magnetic base. A seal prevents contaminated air from reaching the medium from below, via the hub assembly (see detail).

Bernoulli

1) Spicule ledge
2) Read-write heads
3) Dust shutter
4) Hub
5) Upper disk liner
6) Media
7) Lower disk liner
8) Write-protect indicator
9) Air-intake holes



Bernoulli cartridges closely resemble standard floppy disks. Bernoulli technology uses two single-sided platters. The read-write heads move laterally, unlike in the other two drives. The Bernoulli does not filter dust particles, but circulates air to move dust away from the media. Unlike in the SyQuest and Ricoh units, the read-write heads do not actually contact the media, so head crashes cannot be caused by dust particles, and disk crashes are also rare. As seen in the detail, each platter flexes toward the head. An air cushion between the two floppy platters allows them to flex inward should a dust particle approach the head. The cartridge also locks in place while in use, preventing the loss of data that could result from accidentally removing the drive. This is necessary because unlike its competitors, the Bernoulli cartridge protrudes from the drive during operation.



The Ocean Totem IV uses Bernoulli technology.

The rugged Ricoh cartridges, however, feature a mechanism that locks the platter's hub and keeps it from turning when the cartridge is outside of the drive, a shutter that's much more difficult to open than the SyQuest counterpart, and an air filter to keep particles out. Ricoh cartridges also hold about 4.5MB more data than the SyQuest ones, and format to 46.7MB.

Ricoh drives have a simpler eject sequence than the SyQuest units. Dragging the icon of the disk to the Trash unmounts it from the desktop and spins the cartridge down to a stop. The Eject button then pops the cartridge out. Pushing the Start button respins the drive if you wish to remount the cartridge before you have ejected it. Air seals prevent contamination of the platter while it is inside the drive.

Similar Performance

The two Ricoh-based drives (from GCC Technologies and Microtech International) worked well. Both companies provide formatting software. And unlike some SyQuest vendors, both Ricoh distributors bundle an INIT that lets the Mac recognize and mount cartridges even without a cartridge inserted at start-up. Microtech adds a backup program and The Norton Utilities to the package, and GCC includes Symantec's SUM II, a print spooler for QuickDraw printers, an envelope-printing DA, and 4MB of shareware. Cartridges were perfectly interchangeable between the two manufacturers' drives.

The SCSI Evaluator speed tests showed the SyQuest drives to have a slight edge over the Ricoh units in read, write, and seek tests. But in real-world tests, copying and opening a standard application, the two types of drives performed almost identically (see "Cartridge Speed Tests").

Ricoh claims that its sealed cartridge and drive are more reliable than SyQuest's. But as the drives were released only a short time ago, there isn't much consumer-market confirmation.

At $1299 for the units from GCC and Microtech, you will pay triple the price of the cheapest SyQuest drive, and extra cartridges cost more, too (see "The Price of Expansion"). While both companies add extensive software bundles, these are not enough to offset the higher prices.

Bernoulli's Flexible Disk

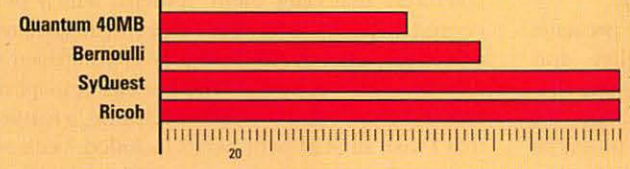
Bernoulli cartridges, made by Iomega, employ a fundamentally different technology. While SyQuest and Ricoh use rigid platters, a Bernoulli cartridge contains a flexible disk in a hard shell, much like a standard floppy disk. A 5¼-inch Ber-

Cartridge Speed Tests

All times are in seconds

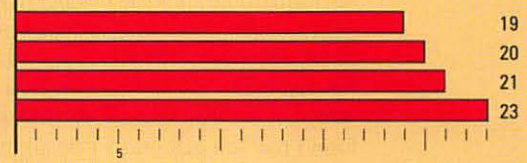
Back Up 10MB Folder

Many people buy cartridge drives for easy backup of their main hard drive. In this standard maintenance task, only the Bernoulli drive approached speeds attained by the Quantum 40MB internal hard drive, shipped with many Macs. If backup is your primary need, Bernoulli is the clear favorite.



Open Excel File

Used as a main hard drive for everyday operations, a cartridge drive performs nearly as well as a Quantum drive. In a common, random-access chore, such as opening a database file, the differences between the three types of cartridge drives and the Quantum were nearly negligible.



REMOVABLE-CARTRIDGE DRIVES COMPARED

Company	Drive	Drive Price [1]	Media Price	Capacity [2]	Termination	SCSI Address	Software Included [3]	Drive/Media Warranty (in years)
SYQUEST DRIVES								
Alliance Peripheral Systems	APS-45R	$59.00	$72	45MB	external	DIP switches	F, PD	2/1
Club Mac	SyQuest 45	$495.00	$70	45MB	internal	push button	O	2/1
CMS Enhancements	MacStack Removable	$999.00	$179	45MB	internal	DIP switches	F	1/1
Cutting Edge	45MB Removable Cartridge Drive	$1139.00	$139	45MB	internal	push button	B, O	2/1
Data Enhancements	ProDisc [4]	$629.00	$79	45MB	Internal [5]	push button	D, F, PD	1/1
DPI	DPI 44 Removable	$570.00	$70	45MB	internal	dial	F	2/1
Ehman	45MB Removable Cartridge Drive	$549.00	$89	45MB	internal	push button	F	2/1
FWB	hammerDisk44	$1195.00	$119	45MB	external	push button	F, O	1/1
Hard Drives International	PowerDrive Removable	$575.00	$79	45MB	external	push button	F	1/1
iDS Systems	iDS 45 Removable	$599.00	$79	45MB	switchable	push button	F, P, S, V [6]	2/1
Jasmine Technologies	Removable 45	$549.00	$79	45MB	external	push button	F, PD	2/1
La Cie	ZFP 45R	$898.00 [6]	$99	45MB	internal	dial	F, N, O, PD, V	1/1
MacLand	SyQuest	$439.00	$68	45MB	internal	push button	F, O	1/1
MacProducts USA	MagicDrive 45 Removable	$499.00	$69	45MB	external [5]	push wheel	B, F, PD, O	2/1
Mactown	DataStor	$499.00	$89	45MB	internal	dial	F	1/1
Mass Microsystems	DataPak [7]	$1199.95	$129	45MB	internal	push button	D, F, PD, O	2/1
Mass Microsystems	DataPakDuet [7]	$2149.95	$129	90MB [8]	internal	push button	D, F, PD, O	2/1
Mass Microsystems	DataPak IIc [9]	$1199.95	$129	45MB	internal	push button	D, F, PD, O	2/1
Mass Microsystems	DataPak II [10]	$1239.95	$129	45MB	internal	push button	D, F, PD, O	2/1
Mass Microsystems	DataPak IIduet [10]	$2219.95	$129	90MB [8]	internal	push button	D, F, PD, O	2/1
MicroNet Technology	MR-45	$995.00	$129	45MB	external	push button	F	1/1
Mirror Technologies	RM42	$617.00	$89	45MB	external	push button	B, F, O	2/1
Optima Technology	DisKovery 45R	$995.00	$149	45MB	external	push button	F, O	1/1
PLI	Infinity40 Turbo Economy	$899.00	$129	45MB	switchable	dial	F, PD	1/1
PLI	Infinity40 Turbo	$999.00	$129	45MB	switchable	dial	B, F, PD, O, V	2/1
Procom Technology	MRD 40	$995.00	$145	45MB	external	dial	911, F, V	1/1
Relax Technology	Relax Mobile 42	$799.00	$119	45MB	external	push button	F, O	2/1
Rodime Systems	R45 Plus	$1399.00	$149	45MB	internal	push button	F	2/1
Ruby Systems	StarDrive 45RX	$580.00	$75	45MB	internal	step switch	F	1/1
Third Wave Computing	45R	$599.00	$72	45MB	internal [5]	push button	F	2/1
Third Wave Computing	45DR	$1099.00	$72	90MB [8]	external	push button	F	1/1
Total Peripherals	TP44-R	$739.00	$99	45MB	internal	push button	F	1/1
RICOH DRIVES								
GCC Technologies	UltraDrive 50R	$1299.00	$129	50MB	external	push button	F, PD, O, S	2/2
Microtech International	Microtech R50	$1299.00	$129	50MB	external	push button	B, D, F, N, X	2/2
Sumo Systems	SSER50	$1300.00	$130	50MB	external	push button	F	1/1
Univation	Q50	$1295.00	$125	50MB	internal	push button	F	1/1
BERNOULLI DRIVES								
Iomega Corporation	Bernoulli Tranportable 44 [11]	$1259.00	$140 [12]	44MB	switchable	push button	F	1/5
Iomega Corporation	Bernoulli Portable 44 [11]	$1699.00	$140 [13]	44MB	switchable	push button	F	1/5
Iomega Corporation	Bernoulli Dual [11]	$2399.00	$140/$90 [12]	65MB [14]	switchable	push button	F	1/5
Ocean Microsystems	Totem IV	$1350.00	$140	44MB	external	push button	F, M	1/5
Ocean Microsystems	Totem IIID	$2350.00	$140	88MB [8]	external	push button	F, M	1/5

[1] List prices; street prices through dealers may be lower. [2] Unformatted capacity. Actual formatted capacities are 42.2MB for SyQuest, 46.7MB for Ricoh, 42.8MB for Bernoulli. [3] 911 = 911 Utilities, B = backup, D = demo commercial software, F = formatting, M = MacTools Deluxe, N = The Norton Utilities, O = Other, P = Print spooler, PD = public domain and shareware, S = SUM II, V = virus killer, X = Mac–MS DOS partitioning software. [4] Also ships in a dual drive format, with one fixed drive, one removable. [5] External option available [6] S and V cost $30 extra. [7] Macintosh Plus/Classic/SE footprint. [8] Two drive mechanisms in one cabinet. [9] Macintosh IIcx, IIci footprint. [10] Macintosh II, IIx, IIfx footprint. [11] Requires one of two Mac-interface cable/software packages for $50 or $130. [12] Double-sided/single-sided cartridge. [13] Single cartridge price. Sold only in three-pack of cartridges for $420 list. [14] Dual drive, using one single-sided, one double-sided cartridge.

noulli cartridge, which holds 42.8MB of data after formatting, looks like a beefy floppy.

Iomega claims that a flexible disk prevents head crashes and increases reliability, and Iomega backs up its boasts with a five-year warranty on media. And these drives are fast. We found the Iomega unit to be superior to any of the SyQuest or Ricoh drives in file-copying tests.

I tested Bernoulli drives from the two manufacturers that offer them: Iomega, which pioneered the technology, and Ocean Microsystems, a licensee. The Ocean Totem IV is an attractive unit that performed well. The Iomega Transportable 44 has switchable SCSI termination, a feature that I wish all SCSI peripherals included, because it eases the torment of proper SCSI termination.

As with most other vendors of removable systems, Ocean and Iomega include an INIT that enables the Mac to mount cartridges after it has been turned on. The Ocean drives ship with one cartridge; the Iomega units with three.

Unlike the SyQuest and Ricoh products, Bernoulli cartridges require a lengthy formatting and testing procedure, which takes almost 20 minutes per cartridge. Of the two Bernoulli vendors, Iomega includes markedly better formatting and testing software. Iomega allows you to switch to another program under MultiFinder while the formatting and testing takes place in the background. Ocean's software ties up the Mac the whole time that it's formatting a cartridge.

Mixed Blessing

The Bernoulli drives provide equal amounts of pleasure and frustration in use. In my tests, the cartridges mounted onto the desktop faster than the Ricoh and SyQuest units, and seemed as fast as a hard drive. I used them to back up my 40MB hard drive, using both Retrospect and DiskFit software. The Bernoulli's speed and convenience made the chore almost fun. Switching cartridges is also easier than with the other two formats, since you don't have to wait as long for the Bernoullis to spin down, eject, and spin up again.

Even with their fine performance, the Bernoulli units have some serious drawbacks. First and foremost, they're pricey. The Iomega Transportable 44 lists for $1259, nearly three times as expensive as the MacLand SyQuest drive. And Bernoulli drives are noisy, especially when accessing the disk.

The drives are also heavy—a problem for Iomega, which has introduced transportable and portable (battery-operated) versions of the unit. The transportable version weighs in at 12 pounds. Despite the handle, the portable unit's 14 pounds (with battery) are too much for the average traveler. Add a 16-pound Mac Portable, then wait for the backache. While preparing this article, I needed to move about 30MB of data from home to my office. Rather than lug along the Iomega Transportable 44, I ended up copying the data onto a SyQuest cartridge and putting the La Cie drive—about 6 pounds—into my briefcase.

Iomega has a large installed base in the IBM PC–compatible market, and has periodically introduced Bernoulli products for the Mac that range in capacity from 10MB to the current 44MB. The latest version, although positioned to compete favorably in capacity and speed against the SyQuest unit, faces an uphill battle because of its high price.

Which to Buy?

Any of these drives will work well for you if you never exchange files with other Macintosh users. All three formats demonstrated comparable performance, and although all had their quirks, they were fairly easy to set up and use.

On balance, the best removable choice for most people remains a SyQuest drive. Despite some legitimate concerns over reliability, there are so many drives in use that the SyQuest format has become the standard with service bureaus, and increased production has brought the cost of some drives, with several cartridges, well under $1000. The fast and easy-to-use Bernoulli technology is my second choice in a removable drive. But the noise bothered me, and I cringe at the thought of tightening my belt a notch to buy, then feed, a Bernoulli drive. Extra Bernoulli cartridges run about 25 percent over the cost of SyQuest cartridges.

Ricoh has a tough road ahead in its attempt to gain market share. The Ricoh products cost considerably more than the SyQuest products, with no significant performance advantage. And Ricoh cartridges are incompatible with the more common SyQuest machines. Considering that Ricoh's claims of better reliability remain unproved, SyQuest remains the favorite. M

See *Where to Buy* for contact information.

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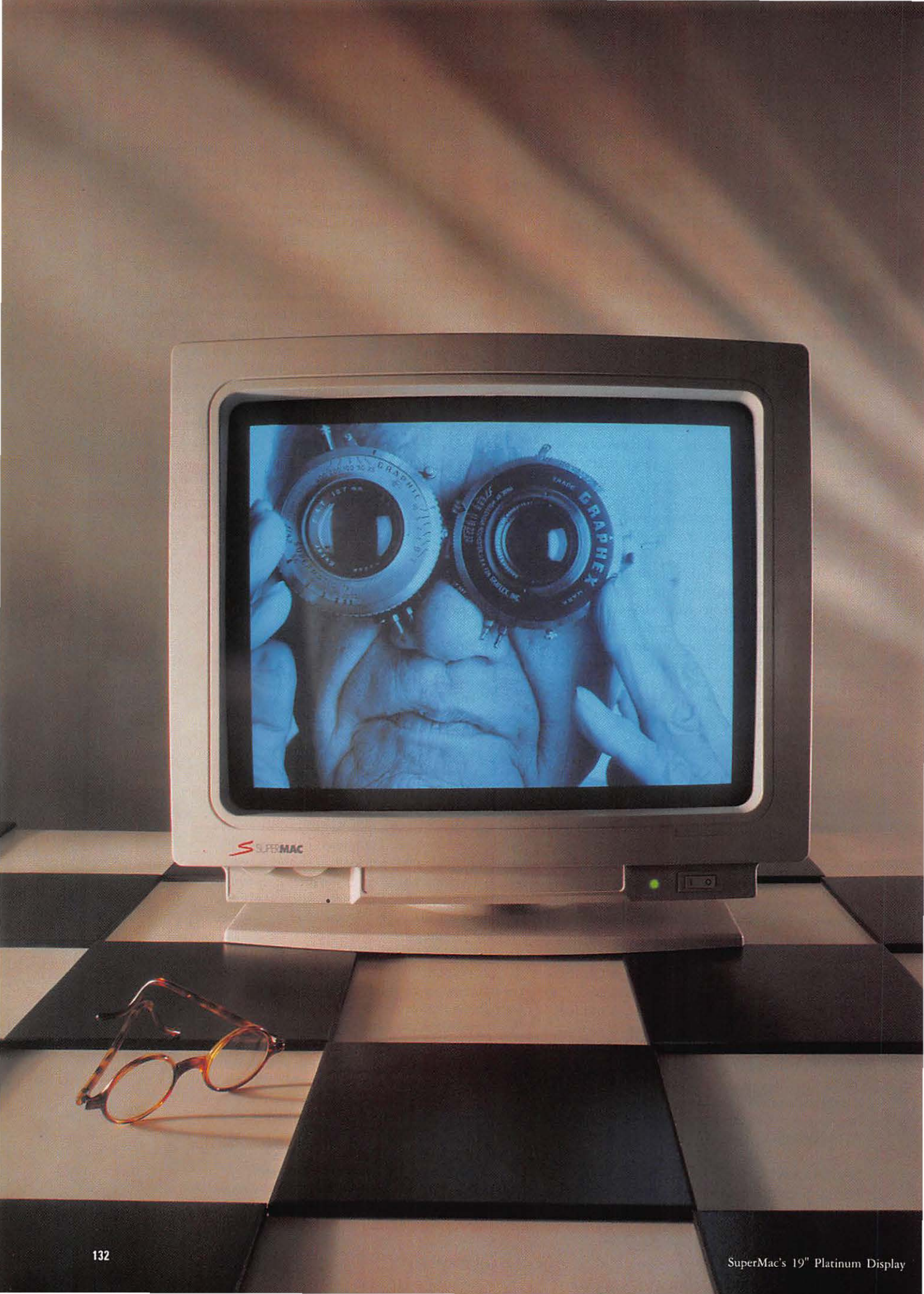
HARD DRIVES TO GO

Removable-cartridge drives aren't the only option if you want to carry data with you. Removable hard drives, such as Image South's SneakerNet, Z Microsystems' Tranzpak, and MegaDrive from Mega Drive Systems, contain the same type of sealed hard drive that is normally installed inside a computer. These units consist of two parts: a cabinet, which holds the power supply for the drive; and the hard drive itself, which comes in a shock-mounted case that plugs in to the cabinet.

Removable hard drives share the advantages of removable-cartridge drives, and offer additional selling points. Since the drive mechanism is sealed, reliability should be superior to any of the cartridge units. Moreover, most hard drives are faster than the times we clocked for the cartridge drives.

And removable hard drives can be much larger—up to 1.3GB for a version of the Tranzpak. Users with high data-security requirements appreciate being able to work on a removable hard drive during the day, then remove the drive and lock it up in a safe at night.

On the negative side, to move data from place to place you need to buy an extra cabinet for the second location. Adding more capacity is also expensive. And because each company uses its own plug scheme, the drives and cabinets from different manufacturers aren't interchangeable. For most of us, a SyQuest or Bernoulli drive represents a cheaper and more convenient option than a removable hard drive.



SuperMac's 19" Platinum Display

Solving the Monitor Mystery

Use Macworld Lab tests, not your intuition, to track down the best monochrome monitor

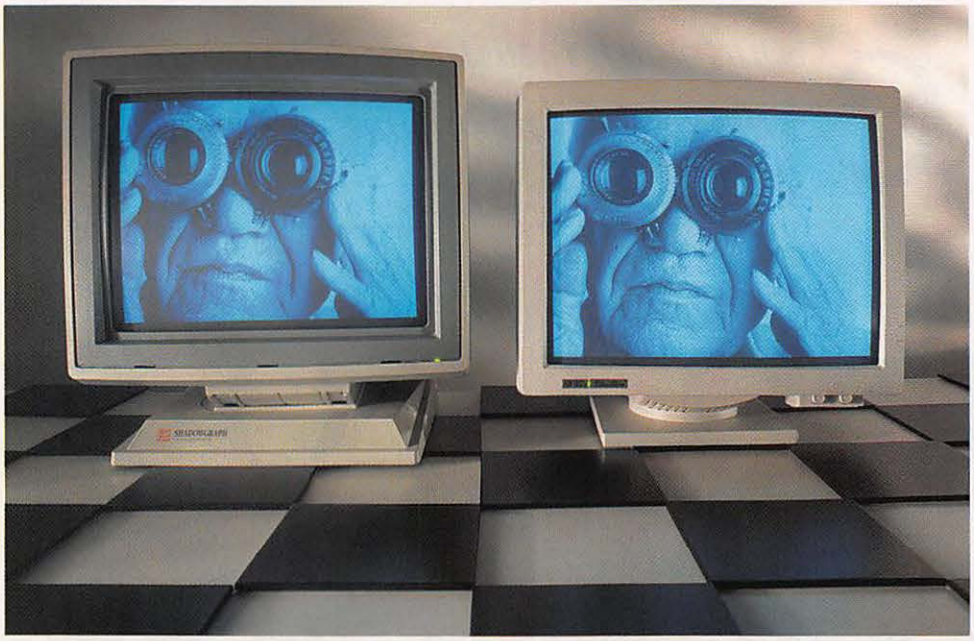
by Robert C. Eckhardt

Photographs by Robin Ginsberg / screen image by Jock McDonald

LONG AGO IN THE OTHERWISE QUIET town of Sleepy Hollow, schoolmaster Ichabod Crane was terrorized by a mysterious, headless horseman. Totally unnerved, Crane left Sleepy Hollow, his job, and his beloved for good. As I look at this year's batch of monochrome (black-and-white and gray-scale) monitors, I find it easy to sympathize with Ichabod Crane. A headless Macintosh is not nearly as terrifying as a headless horseman, of course, but determining which type of monitor should sit atop (or beside) your Mac can be a frightening experience. While you're not likely to leave town or lose a loved one if you fail to pick the correct monitor, you may waste a lot of money, work less productively, or strain your eyes unnecessarily.

On the following pages, I help you put the right monochrome head on top of a Mac II, or a second head beside a Mac Plus, Classic, SE, or SE/30. The overall quality of the systems Macworld Lab and I tested was higher than ever—so high that it was often necessary to make fine

distinctions to choose among them. We submitted 38 black-and-white and gray-scale monitor systems—board-and-monitor combinations from a single vendor—to a battery of objective measurements and subjective evaluations. (Although it is possible to buy monitors and boards separately, we chose to test and report on whole systems because the best price is usually obtained in a system purchase, and because most people prefer the simplicity and convenience of one-stop shopping.) The results of our tests are reported below.



For the budget-minded, PCPC's solid ShadowGraph (left) is an excellent bargain in the two-page gray-scale display category. For those who don't mind spending a bit more, Sigma Designs' amber-colored SilverView Grayscale is high on our list of favorites.

First Cut

Faced with so many display systems, the first thing I did was subdivide them into groups based on gray levels. Gray-scale monitors can display up to 256 shades of gray, while black-and-white monitors can display only two (black and white). Gray-scale adds significantly to the cost of a display system but is essential if you work with scanned photos or many kinds of PostScript art. Black-and-white systems are less expensive and perfectly adequate for tasks that occupy most of the workaday world: word processing, number-crunching, data processing, and bitmapped and object-oriented drawing. In addition, since it has to keep only two balls in the air at one time, rather than 256, a black-and-white monitor is faster and more responsive.

Next, I divided the monitors by size. In comparison to a compact Mac's 9-inch diagonal screen, small 12-inch to 15-inch displays aren't really so small. With pixel dimensions of 640 by 480, these displays can't accommodate a full page either vertically or horizontally, but they're large enough for many people (including me), and the price is low.

Unlike most monitors, those with full-page displays orient their 15-inch screens vertically. Most monitors in this class have pixel dimensions of 640 by 870 (plus or minus a pixel or two) and can display a full, US Letter–size page. Wordsmiths and others who think in 8½-by-11-inch chunks find full-page displays a nice compromise between the somewhat confined small displays and the more expensive two-page displays.

Two-page displays have, for the most part, 19-inch and 21-inch screens and fall in two pixel-dimension groups: 1024 by 768 and 1152 by 870 or thereabouts (the pixel dimensions don't necessarily correspond to the tube size). Despite their name, most cannot display a full two pages. Displays with the smaller dimensions chop off about 1 inch top and bottom and 2 inches right and left; those with the larger dimensions lose about 1 inch right and left. Nonetheless, two-page monitors are prized by people who produce newsletters and other periodicals, work on very large spreadsheets, or create large or complex graphics. As with real estate, however, the greater acreage demands a premium price.

When purchasing a monitor, first narrow your choices by dividing up the monitor pie just as I have and determining which slice appeals to you. Next, look more closely at the choices available within that slice. Eliminate those monitors that are incompatible with your Macintosh, then check out the price and quality of the finalists. Price is straightforward (although street prices can be significantly lower than suggested retail). Quality is quite another matter, however, since it is the sum of many parts: focus, contrast, brightness, distortion, and phosphor color.

Two-Page Black-and-White Displays

The 14 two-page black-and-white displays we reviewed range in price from about $900 (Ehman's Two-Page Monochrome display and Mirror Technologies' PixelView II) to about $2400 (Radius's TPD/21). They range widely in phosphor color, too, from the strong blues of the MegaGraphics Rival and Radius's TPD/21 to the noticeably amber L-View and SilverView from Sigma Designs and the Viking 3/72 M from Moniterm. The remaining monitors—such as Dotronix's MegaScreen 21" and RasterOps' ClearVue/II and SE (see "Quality Tests")—are a more neutral white.

In our subjective evaluation, brightness and contrast rate a good or better on almost all the monitors. For instance, although Macworld Lab

MACWORLD MW LAB

Quality Tests

Brightness

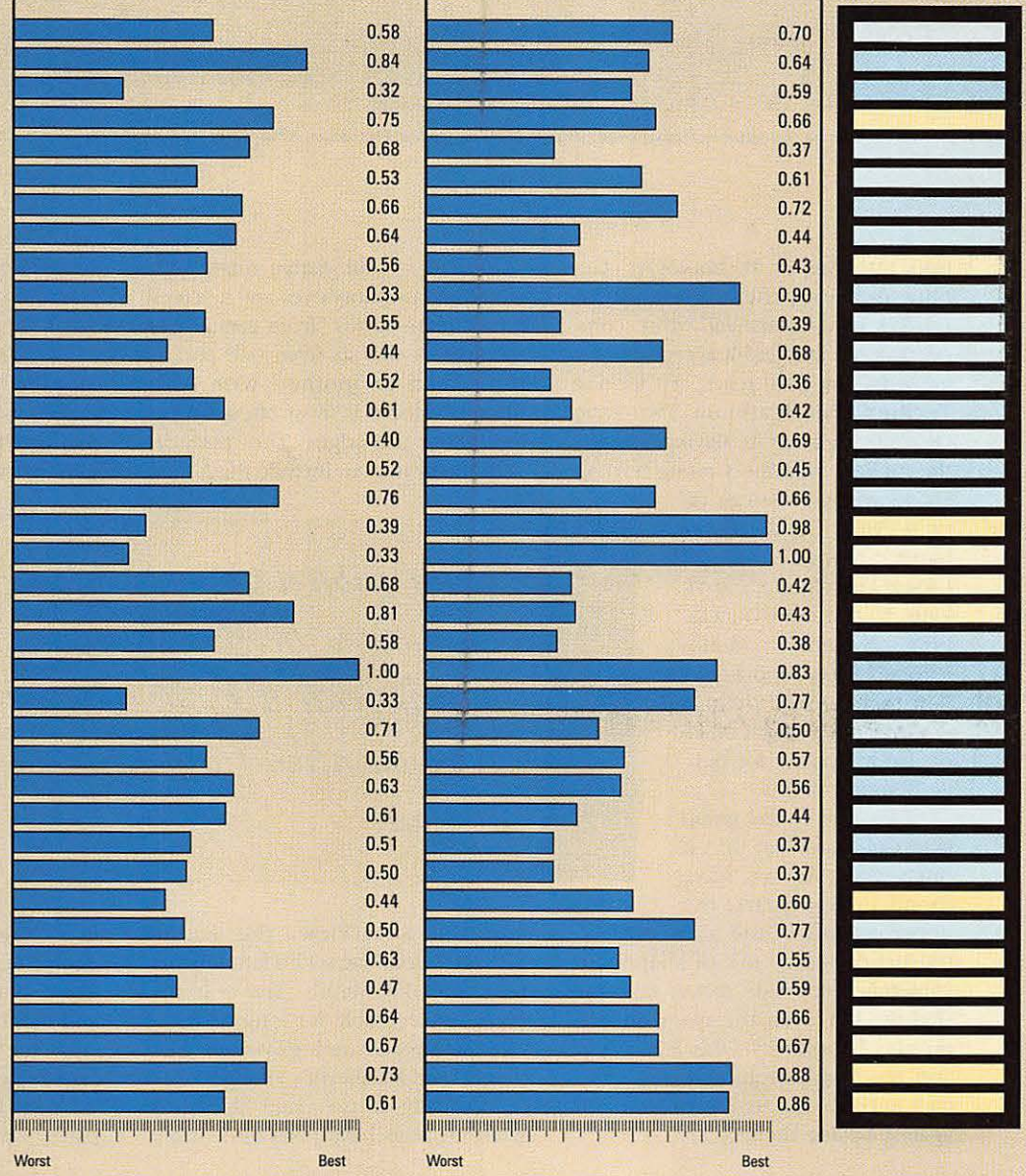
The brighter a monitor is, the more flexibility you have in adjusting it to your environment. Also, most people prefer a bright monitor. For each monitor, we turned the brightness up as high as it would go without showing scan lines. We then measured brightness using a Minolta luminance meter. The brightest monitor was the Qume QM880 at 59.54 footlamberts; the dimmest, the Apple Two-Page Monochrome at 19.04 footlamberts. All of the monitor test results were indexed relative to the QM880.

Contrast

The better a monitor's contrast is, the better you can see details in light or dark areas of an image. High contrast also makes a monitor more appealing to look at. To measure contrast, we displayed five white squares on the monitor—one in each corner, and one in the center. We used a Minolta luminance meter to measure the ratio of the white square to the black background beside the square. We then averaged the ratios. Moniterm's Viking 3/72M had the best contrast ratio at 10.08; MegaGraphics Grayscale had the worst at 3.63. All of the monitor test results were indexed relative to the Viking 3/72 M.

Phosphor Color

Although the monitors reviewed are black and white or gray scale, each has a distinctive color tint. Monitors that subjectively appear closest to paper white are usually a light blue according to our test instruments. The colors below are representative of the tints of the monitors we tested.



[1] *Monochrome Card.*
[2] *Spectrum/8 Series III.*
[3] *Spectrum/8 PDQ.*

TWO-PAGE BLACK-AND-WHITE MONITORS COMPARED

Company	Dotronix	Dotronix	Ehman	Generation Systems	Genius Technologies	MegaGraphics	Mirror Technologies	Moniterm Corporation
Monitor name	MegaScreen 19"[1]	MegaScreen 21"	Two-Page Monochrome	Monochrome Display	Genius Dual Page Monitor	MegaGraphics Rival	PixelView II	Viking 3/72 M
System price (board and monitor)	$1499	$1699	$899	$1519	$1395	$1698[2]	$897	$1295
Mac SE and SE/30 compatible	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●
Mac II compatible	●	●	●	●	●	●	●	●
Other Mac compatibility	none	none	none	Classic, LC, Portable	none	Plus, LC, Portable	Plus, Classic	none
Diagonal size (in inches)	19	21	19	19	19	19	19	19
Active area (w × h, in inches)	13.7 × 11.0	15.2 × 11.3	13.9 × 10.7	14.2 × 10.6	14.2 × 10.8	13.8 × 11.0	14.2 × 10.7	14.2 × 10.5
Pixel dimensions	1024 × 768	1152 × 872	1024 × 769	1024 × 768	1152 × 872	1024 × 826	1024 × 768	1024 × 768
Pixel density (in dpi)	72	75	72	72	72	75	72	72
Vertical refresh rate (in Hz)	75	71	78	78[3]	75	75	78	78
Antiglare treatment	●[4]	●[4]	○	●	○	●	●	●
Tilt-and-swivel stand included	●	●	●	●	●	●	●	●
Special features for compact Macs								
Use both screens	●	●	●	●	●	●	●	●
Adjust cursor crossover point	●	●	○	○	●	●	●	●
Display same image on both screens	○	○	○	○	○	●	○	○
Warranty period (in years)	1	1	1	1	1	2	1	1
Extended warranty available	●	●	○	○	○	●	○	●

● = yes; ○ = no. [1] *System was not tested by Macworld Lab.* [2] *Price is $1848 for the Mac Plus version.* [3] *75Hz when used with the Classic.* [4] *This feature is optional.*

tests rate Genius Technologies' Genius as having the worst contrast relative to its black-and-white competitors, we still find it acceptable for viewing. In Lab tests, SuperMac Technology's Platinum Two-Page Display stands out for having not only the highest brightness rating but an above average contrast ratio as well. On the other hand, Sigma Designs' L-View Multi-Mode, the Viking 3/72 M, and Generation Systems' Monochrome Display appear too dim to us. Avoid them if you work in a bright office or use a monitor for public demonstrations.

Distortion in this group is less of a problem than it once was. As we have found in past years, the upper corners of the active area often bend slightly out of shape and sometimes one side arches or bows slightly, but even the worst in this group of monitors—the SilverView and the MegaGraphics Rival—aren't bad enough for us to recommend against buying them.

Focus—a subjective quality we tested with squinty eyes and a screen full of text—varies from monitor to monitor as well as from one part of the screen to another. With large monitors, focus is most often a problem along the edges. The monitors with the best focus include the L-View and the SilverView, the Radius TPD/21, SuperMac's 19" Platinum Display, and the Genius. The only displays unacceptable for long hours of close work are Nutmeg Systems' Nutmeg 19 and Moniterm's Viking 3/72 M.

In our subjective evaluation, brightness and contrast rate a good or better on almost all the monitors

Virtually all two-page black-and-white displays have pixel dimensions of 1024 by 768 or thereabouts. The odd monitors out are the SilverView (at 1152 by 870), the MegaScreen 21" (at 1152 by 872), and the L-View Multi-Mode, which can display six different pixel dimensions between 512 by 384 and 1664 by 1200. The L-View Multi-Mode accomplishes this trick by changing pixel densities, from a low of 36 dpi to a high of 120 dpi. Otherwise, most two-page black-and-white displays have pixel densities between 72 and 77 dpi.

Overall, Macworld Lab members and I agree that the Ehman Two-Page Monochrome is a remarkable bargain. The Genius, which is slightly more expensive, comes in a close second in the budget category. In the money-is-no-object division, our favorites are the SilverView and the 19" Platinum Display.

Two-Page Gray-Scale Displays

We tested 14 two-page gray-scale displays, 5 with pixel dimensions in the

Moniterm Corporation	Nutmeg Systems	Radius	Radius	RasterOps Corporation	RasterOps Corporation	Sigma Designs	Sigma Designs	SuperMac Technology	SuperMac Technology
Viking 3/2400 M[1]	Nutmeg 19	TPD/19[1]	TPD/21	ClearVue/II and SE	ClearVue/XL[1]	L-View Multi-Mode	SilverView	19" Platinum Display	Platinum Two-Page Display
$2090	$1499	$1990	$2390	$1795	$2195	$1999	$1999	$1898	$2298
●/⊙	●/●	●/●	●/●	●/⊙	○/○	●/●	●/●	⊙/⊙	○/○
●	●	●	●	●	●	●	●	●	●
none	none	none	none	none	none	LC	none	none	none
24	19	19	21	19	21	19	21	19	21
18.0 × 13.0	14.2 × 10.7	14.0 × 10.7	15.5 × 11.9	14.1 × 10.4	15.0 × 11.2	14.0 × 10.1	16.0 × 12.0	14.2 × 10.6	15.0 × 11.2
1280 × 960	1024 × 768	1152 × 882	1152 × 882	1024 × 768	1152 × 870	512 × 384 to 1664 × 1200	1152 × 870	1024 × 768	1152 × 870
72	72	82	74	72	77	36, 46, 60, 72, 92, 120	72	72	77
66	78	70	70	72	75	63 to 92	73	75	75
●[1]	●	○	○	●	●	●	○	●	●
⊙	●	●	●	●	●	●	●	●	●
●	●	●	●	●	NA	⊙	●	NA	NA
●	●	●	●	●	NA	⊙	○	NA	NA
⊙	○	○	○	●	NA	⊙	○	NA	NA
1	1	1	1	1	1	1	1	1	1
●	○	○	○	●	●	⊙	○	⊙	○

1152 by 870 size (SuperMac Technology's Platinum Two-Page Display, Radius's TPD/21, Sigma Designs' SilverView GS, Apple's Two-Page Monochrome, and Calcomp's Gray-Vision Two-Page Display), and the remainder in the 1024 by 768 range. Again, most pixel densities range from 72 to 77 dpi. The price spread is much greater in this group, ranging from $1595 (for PCPC's ShadowGraph) to $3195 (for Calcomp's Gray-Vision Two-Page Display).

In terms of phosphor color, Relax's Ikegami Grayscale Package, Radius's TPD/21, Apple's Two-Page Monochrome, and PCPC's ShadowGraph tend toward blue. The Platinum Two-Page Display, the Gray-Vision Two-Page Display, and the SilverView GS tend toward amber (see "Quality Tests").

Subjectively, the Radius TPD/21 is not bright enough for us. But the Apple Two-Page Monochrome is even less bright—dim enough, in fact, to quickly tire the eyes in bright ambient light. The brightest monitors are the Nutmeg 19G, the Calcomp Gray-Vision, the Dotronix MegaScreen 19", and SuperMac's 19" Platinum Display. Despite its dimness, the TPD/21 ranks at the top, along with the 19" Platinum Display, in subjective tests of contrast. In general, our lab tests show that gray-scale monitors rank lower on contrast than black-and-white ones.

The active areas of the gray-scale monitors are all slightly atilt, the Dotronix MegaScreen 19" so much so that the top left edge of the menu bar is cut off. Other, minor distortions are visible in almost all monitors, the upper left corner being, as usual, the most troublesome. Overall, the worst offenders are the SuperMac Platinum Two-Page Display (which has a wavy upper border), Sigma Designs' SilverView Grayscale (which has a pronounced bow at the top), and the Dotronix 19". Less severe distortions appear in the MegaGraphics Grayscale (whose bottom border droops) and the Calcomp Gray-Vision (which curves noticeably at the sides).

While we can live with most of these distortions (the tilt of the Dotronix being a possible exception), we cannot say the same for the focus problems that some monitors display. Focus is best on the SilverView Gray-scale, SuperMac's 19" Platinum Display, RasterOps' ClearVue/GS, and the Radius TPD/21. At the other extreme, SuperMac's Platinum Two-Page Display, Calcomp's Gray-Vision, and the Nutmeg 19G are out of focus for considerable distances from the right and left edges—so much so that we have doubts about their long-term use with text-based applications.

Altogether, for the budget minded, Lab members and I recommend either PCPC's ShadowGraph or Relax's Ikegami system; both offer reasonable quality and rock-bottom prices. There is less agreement among us concerning the money-is-no-object category. The SuperMac 19" Platinum Display tops several lists of favorites (it's definitely the one I recommend); the SilverView Grayscale tops others. And if we were asked which monitors in this group to avoid, we would pick two: SuperMac's Platinum Two-Page Display and the Nutmeg 19G.

Full-Page Displays

We tested eight full-page display systems, one of which, Radius's Pivot, doubles as a small horizontal display by rotating on its axis. These systems

TWO-PAGE GRAY-SCALE MONITORS COMPARED

Company	Apple Computer	Calcomp	Dotronix	Dotronix	Generation Systems	MegaGraphics	Moniterm
Monitor name	Two-Page Monochrome	Gray-Vision Two-Page Display	MegaScreen 19[1]	MegaScreen 21[1]	Grayscale Display	MegaGraphics Grayscale	Viking 3/72 GS
System price (board and monitor)	$2797	$3195	$2065	$2290	$1999	$2548[2]	$1990
Mac SE/30 and II compatible	○/●	○/●	●/●	●/●	○/●	●/●	●/●
Diagonal size (in inches)	21	21	19	21	19	19	19
Active area (w × h, in inches)	15.0 × 11.3	15.0 × 11.3	13.7 × 11.0	16.0 × 12.0	14.2 × 10.6	13.7 × 11.0	14.2 × 10.5
Pixel dimensions	1152 × 870	1152 × 870	1024 × 826	1152 × 872	1024 × 768	1024 × 826	1024 × 768
Pixel density (in dpi)	77	72	75	75	72	75	72
Vertical refresh rate (in Hz)	75	75	69	71	75	70	75
Antiglare treatment	●	●	●[4]	●[4]	●	●	●
Tilt-and-swivel stand included	●	●	●	●	●	●	●
Special features for compact Macs							
Use both screens	NA	NA	●	●	NA	●	●
Adjust cursor crossover point	NA	NA	●	●	NA	●	●
Display same image on both screens	NA	NA	○	○	NA	●	○
Warranty period (in years)	1	1	1	1	1	2	1
Extended warranty available	●	○	○	○	○	●	●

● = yes; ○ = no. [1] System was not tested by Macworld Lab. [2] Price is $2598 for the SE/30 version. [3] Price is $1695 for the SE/30 version. [4] This feature is optional.

range in price from $499 for Ehman's Full-Page Monochrome to $1840 for Radius's gray-scale Pivot. Since they are intended primarily for text work, most full-page displays are black and white. Exceptions are Radius's Pivot, which displays up to 16 shades of gray, and Apple's Portrait Display and Qume's QM885, which can display 256 gray shades. The majority of portrait displays also have pixel densities of 78 or 80 dpi. The Nutmeg/Xerox Full Page Display, Qume's QM885, and MacTel's Index Portrait Monitor use a more standard 72 dpi; and Sigma Designs' PageView can switch among pixel densities of 72, 80, and 88, with corresponding pixel dimensions of 576 by 768, 640 by 870, and 704 by 940.



With one exception, all the portrait displays have very good focus—a cut above that in two-page displays

Differences in phosphor color are not nearly so noticeable as in the two-page displays (see "Quality Tests"). Apple's Portrait Display and the Qume QM885 tend toward blue, while the rest display minor variations on a bluish white. The most visually appealing of these is Mobius Technologies' One Page Display. In terms of brightness, all the full-page displays are acceptable. Among the group, the Apple and Mobius monitors stand out as the brightest, while MacTel's Index, Mirror Technologies' PixelView I, and Qume's QM885 are the dimmest. Contrast is also good on most monitors; in Macworld Lab tests, all of the full-page displays scored in the middle of the pack or better. Subjectively, however, we thought that the PixelView I and the Index fall below par, the PixelView I especially so.

Generally, distortion along the sides of full-page displays is more noticeable than in two-page displays. Although Sigma Designs' PageView has the most noticeable distortion, none of these departures from true linearity are distressingly distracting. What I do sometimes find unpalatable, however, is the curvature of the long axis of the video tube itself. The Qume, Sigma Designs, Apple, Radius Pivot, and Mobius portrait displays all use superflat tubes that largely avoid the problem. The MacTel, Ehman, and Mirror displays, on the other hand, use a more convex tube, which makes the screen appear as if it were bending over backward; if you're considering buying one of these three, check to be sure the curve of the screen doesn't irritate you.

With the exception of Mirror's PixelView I, which has unacceptably poor focus, all the portrait displays have very good focus—a cut above that in the two-page displays, in fact. Best of the lot are Mobius's One Page Display and Ehman's Full-Page Monochrome. It's a little-known fact that pixel size and shape differ from monitor to monitor. Since character strokes are often no more than one or two pixels wide, text that's bold and easy to read on

Nutmeg Systems	PCPC	Radius	Radius	RasterOps Corporation	Relax Technology	Sigma Designs	SuperMac Technology	SuperMac Technology
Nutmeg 19G	ShadowGraph	TPD/19[1]	TPD/21	ClearVue/GS	Ikegami Gray-scale Package	SilverView Grayscale	19" Platinum Display	Platinum Two-Page Display
$1899	$1595[3]	$2790	$3190	$2195	$1659	$2399	$2398	$2798
●/●	●/●	●/●	●/●	○/●	○/●	○/●	○/●	○/●
19	19	19	21	19	19	21	19	21
14.2 × 10.7	14.0 × 10.8	14.0 × 10.7	15.5 × 11.9	14.4 × 10.8	14.3 × 10.4	16.0 × 12.0	14.2 × 10.6	15.0 × 11.2
1024 × 768	1024 × 768	1152 × 882	1152 × 882	1024 × 768	1024 × 768	1152 × 870	1024 × 768	1152 × 870
72	72	82	74	72	72	72	72	77
78	75	70	70	75	68	73	75	75
●	●	○	○	●	●	○	●	●
●	●	●	●	●	●	●	●	●
●	●	●	●	NA	NA	NA	NA	NA
●	○	●	●	NA	NA	NA	NA	NA
○	○	○	○	NA	NA	NA	NA	NA
1	1	1	1	1	1	1	1	1
○	○	○	○	●	○	○	○	○

some monitors can appear fuzzy or anemic on others. Thus, because full-page displays are most often used for text work, we also rated these monitors—purely subjectively—for text display. The members of the Lab and I judge the Ehman, Apple, Mobius, and Sigma Designs full-page displays to be the most readable. Text on the others is, we feel, either too light or insufficiently sharp.

Overall, we find it difficult to choose between the Ehman, Apple, Mobius, and Sigma Designs full-page displays. For the bargain hunter, the Ehman's price can't be beat. The Mobius is a little more expensive, and it's very bright, very sharp, very easy on the eyes. The Apple display is, well, predictably Apple: very good quality, though perhaps not the best, and rather expensive. Sigma Designs' PageView is also relatively expensive; the extra expense is worth it if you need the flexibility of three different pixel densities.

Small Displays

We tested three small displays, the Apple 12" Monochrome and two 15-inch displays, Qume's QM880 and Radius's Pivot (in its horizontal orientation). The Pivot can produce 16



For small monitors, Apple's 256-gray-scale 12" Monochrome monitor (left) was easily our favorite. For full-page displays, Ehman's Full-Page Monochrome (right) is the least expensive and offers solid quality. But we also like the Portrait Display from Apple, Mobius's One Page Display, and Sigma Designs' PageView (not shown).

FULL-PAGE AND SMALL MONITORS COMPARED

Company	FULL PAGE MONITORS Apple Computer	Ehman	Generation Systems	Genius Technologies	MacTel Technology Corporation	Mirror Technologies
Monitor name	Portrait Display	Full-Page Monochrome	15" One-Page Display	Genius Full Page Monitor[1]	Index Portrait Monitor	PixelView I
System price (board and monitor)	$1747	$499	$999	$849[2]	$579	$497
SE and SE/30 compatible	○/○	●/●	●/●	●/●	●/●	●/●
Mac II compatible	●	●	●	●	●	●
Other Mac compatibility	none	Plus, Classic	LC, Classic, Portable	none	none	Plus, Classic, Portable
Maximum number of gray levels	256	2	2	2	2	2
Diagonal size (in inches)	15	15	15	15	15	15
Active area (w × h, in inches)	7.8 × 11.0	7.8 × 10.5	7.8 × 10.4	7.7 × 10.4	7.9 × 10.5	8.0 × 10.9
Pixel dimensions	640 × 870	640 × 870	640 × 870	640 × 872	640 × 870	640 × 870
Pixel density (in dpi)	80	80	80	80	72	80
Vertical refresh rate	75	75	75	70	75	75
Antiglare treatment	●	○	○	●	●	●
Tilt-and-swivel stand included	●[4]	●	●	●	●	●
Special features for compact Macs						
Use both screens	NA	●	●	●	●	●
Adjust cursor crossover point	NA	○	●	●	●[5]	●
Display same image on both screens	NA	○	○	○	○	○
Warranty period (in years)	1	1	1	1	1	1
Extended warranty available	●	○	○	○	○	○

● = yes; ○ = no. [1] System was not tested by Macworld Lab. [2] Mobius One Page Display 030 is $995 and includes an accelerator. [3] Gray-scale version is $1840; IIsi and IIci version $1295.

shades of gray; it has pixel dimensions of 864 by 640 and a pixel density of 78 dpi. The other two monitors display up to 256 gray shades and have significantly smaller pixel dimensions of 640 by 480. Qume's pixel density is a standard 72 dpi; the Apple monitor's higher pixel density—76 dpi—allows it to squeeze the same pixel dimensions onto a smaller screen.

The Qume QM880 has a white phosphor color with a very subtle purple cast. In comparisons that include the larger gray-scale monitors as well, we rate it as among the best in brightness and contrast. Large out-of-focus areas make us question the QM-880's suitability for text work, however, and significant distortion (which results in oval-shaped circles, for example) is also a drawback. Factoring in its moderately high price, we cannot recommend the QM880.

As with all Radius monitors, the Pivot's phosphor color is on the blue side. In terms of brightness, contrast, focus, and distortion, the Pivot rates well, although never as good as the best. Lab members and I don't particularly care for the way it displays text; we find text strokes too thin, and vertical elements are often ghosted with a faint double image. The Pivot is the most expensive of the three small-screen monitors; for the extra money, you get larger pixel dimensions and a monitor that—when tilted upright—doubles as a full-page display. (With few exceptions the screen automatically redraws to fit the current orientation each time the Pivot is tilted.) Although it's not the best in either the small-screen or full-page categories, it's cheaper than buying one of each.



If you have a Macintosh with on-board video, Apple's 12" Monochrome is an undeniable bargain. With a video board, the price approaches the QM880's, but we found the paper-white Apple display superior in almost all respects. It is one of the brightest gray-scale monitors we looked at; it has excellent contrast and focus, and negligible distortion; and it's about as compact a monitor as we've seen. Overall, we have no difficulty picking the Apple display as our first-choice small monitor.

Mac SE, SE/30, and Classic Displays

Many of the monitors described above can be used as a second monitor for the SE, SE/30, and Classic as well as with the Mac II family. In general, a monitor's attributes are largely independent of the board that runs it and the computer it is hooked up to. The only exception to this rule is brightness—some boards are tuned to drive a monitor more brightly than others are. Since brightness differences are usually relatively minor (about 2 to 3 foot-lamberts, or 5 to 10 percent), how-

Mobius Technologies	Nutmeg Systems	Qume Corporation	Radius	Sigma Designs	SMALL MONITORS Apple Computer	Qume Corporation
Mobius One-Page Display	Nutmeg/Xerox Full Page Display[1]	QM885	Pivot	PageView Multi-Mode	12" Monochrome	QM880
$795[2]	$999	$1089	$1694[3]	$1199	$947	$1099
●/●	●/●	○/○	○/●	●/●	○/○	●/○
●	●	●	●	●	●	●
none	none	none	none	Classic	none	none
2	2	256	16[3]	2	256	256
15	15	15	15	15	12	15
8.2 × 11.0	8.0 × 10.0	8.3 × 10.4	8.3 × 11.1	8.0 × 10.7	8.4 × 6.3	9.4 × 7.8
640 × 872	606 × 760	640 × 872	864 × 640,	576 × 768, 640 × 870,	640 × 480	640 × 480
78	72	72	78	72, 80, 88	76	72
75	76	68	69	80 to 97	67	66
●	●	●	○	●[4]	●	●
●	●	●	●	●	●[4]	●
●	●	NA	●	●	NA	○
●	●	NA	●	○	NA	○
○	○	NA	○	○	NA	○
1	1	1	1	1	1	1
●	○	○	○	○	●	○

[4] *This feature is optional.* [5] *Only on the SE/30 system.*

ever, the favorites I've already picked apply to SE and SE/30 systems as well.

When purchasing a second screen for a compact Mac, the software that makes it function properly can be an important consideration. Most drivers allow you to use both screens at the same time (Sigma Designs' L-View is one that does not), while in a few systems, such as the MegaGraphics Rival and RasterOps' ClearVue/SE, you can display the same view on both screens at the same time (for a live demonstration, say). All allow you to specify whether the Mac screen is to the left or the right; only in some, however, can you adjust the cursor crossover point so that it matches the actual vertical relationship of the two monitors.

Keep in mind that large screens attached to an SE are usually sluggish due to the SE's slower overall speed. You need to purchase a compatible accelerator if you want to pep things up. (MegaGraphics claims that its Rival monitor is unique in being compatible with all available accelerators.) Notable exceptions to this are the RasterOps ClearVue and the Mobius One Page Display, both of which include acceleration—at no extra charge—as part of the standard SE system.

As this article goes to press, only two companies are shipping display systems for the Mac Classic. Generation Systems offers two black-and-white systems: a 19" Monochrome Display and a 15" One Page Display system. Mirror offers versions of its PixelView I and II systems for the Classic; the display characteristics and prices are the same as for the other configurations. RasterOps had announced that a Classic version of its ClearVue system would ship by spring. We did not test any of these Classic systems, but we feel safe in saying that monitor quality will be comparable to that in the corresponding Mac II and SE systems.

Final Cut

It wasn't that long ago that you had to pay top dollar for a monitor that didn't give you a headache. It is thus a welcome sign that there are excellent, budget-priced choices in every monitor category, and that some of our favorites are among the least expensive. For those interested in a lot of real estate, we recommend two black-and-white two-page displays. At $899, Ehman's Two-Page Monochrome display is an excellent buy for the Mac owner on a budget; for those with deep pockets, Sigma Designs' SilverView ($1999) is our top pick. For gray-scale two-page displays, PCPC's ShadowGraph ($1595) topped the list in the budget category. But if money were no object, we'd buy SuperMac's 19" Platinum Display ($2399).

If you want a full-page display, we recommend the Ehman; it's rare to find such high quality and low price ($499) in the same monitor. And if you need only a relatively small monitor, Apple's new 12" Monochrome Display is an unbeatable bargain ($299 for the monitor alone) if your Macintosh has on-board video. Macintosh godfather Steve Jobs would no doubt approve that larger monitors are, more than ever before, within reach of the rest of us. M

See *Where to Buy,* under Monochrome Monitors, for contact information.

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Personal

PAGE PRINTERS ARRIVE

A new generation of printers and software provides affordable laser-quality output

by Jim Heid

If you long for a laser printer but are waiting to buy until prices fall, prepare to reap your reward. The past year marked the birth of the Volkslaser. Apple, QMS, GCC Technologies, NEC, Texas Instruments, and others unveiled new 300-dots-per-inch laser printers aimed at individuals and small businesses. For retail prices between $999 and $3455, you can buy a printer that provides more fonts, better print quality, and faster performance than Apple's original $6995 LaserWriter.

This article discusses issues you should consider when shopping for a personal laser printer. "Personal Printer Profiles" and "Rating Personal Printers" show comparisons of the 12 printers I tested.

If even $999 exceeds your definition of affordable, take heart. Apple's petite new StyleWriter ink-jet printer has joined the Hewlett-Packard DeskWriter in offering print quality that approaches that of a laser printer—for well under $1000 (see "The Ink-Jet Challenge to Laser Printers"). (For more details on the StyleWriter and Apple's new Personal LaserWriter LS, see *Macworld News* in this issue.)

QuickDraw, PostScript, or Both?

The search for the right personal laser printer begins with a selection between printers that rely on Adobe Systems' PostScript page-description language and those that rely on QuickDraw, the Mac's built-in library of text- and graphics-display routines.

Either a PostScript or a QuickDraw printer can handle text-oriented documents such as correspondence, manuscripts, and contracts. But for printing desktop publications, illustrations, scanned images, and other graphics-intensive jobs, choose a PostScript printer. Built-in networking features also make a PostScript printer almost essential if you have more than one computer (whether Mac or IBM PC).

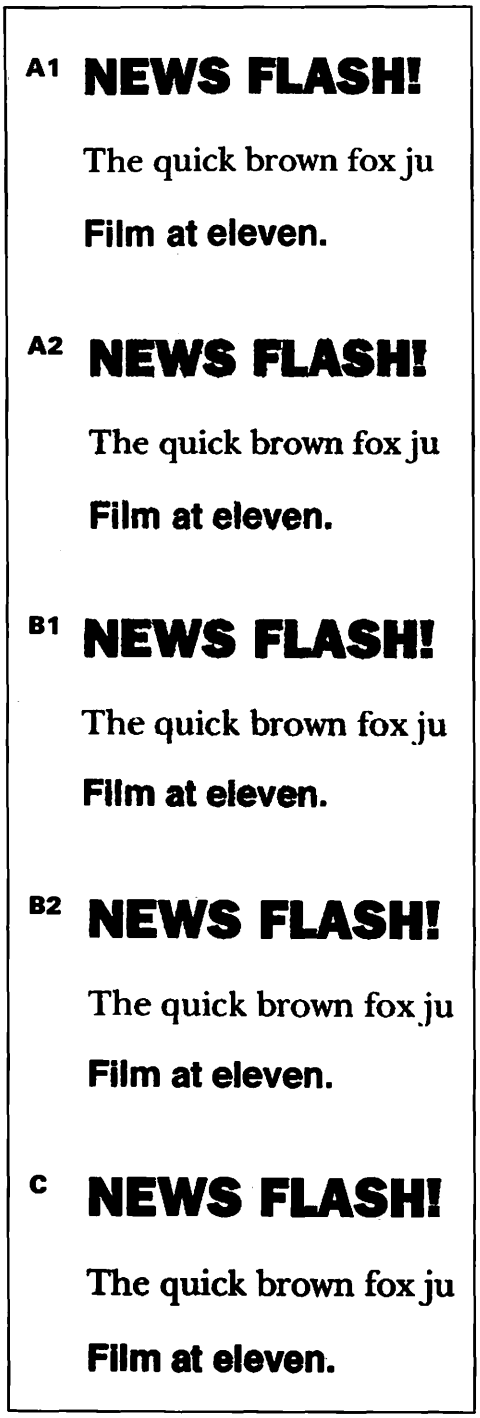
PostScript printers often operate more quickly because they relieve the Mac of most of the work involved in printing a page. PostScript printers offer so many advantages—some technical, some byproducts of PostScript's popularity—that it's hard to imagine choosing any other kind of printer.

Until you compare prices. PostScript printers cost more than comparable QuickDraw printers, due to their more-sophisticated controller circuitry and the licensing and royalty fees Adobe Systems charges printer manufacturers. For example, GCC Technologies' QuickDraw-based PLP II retails for $999; its PostScript-driven cousin, the BLP II, sells for

PHOTOGRAPHS BY MARK JOHANN/OUTPUT IMAGE BY NICK WIGGINS



Front runners: The Apple Personal LaserWriter LS (top) and the QMS-PS 410.



Seeing Is Believing With ink-jet printers, paper quality often dictates output quality. Figures A1 and A2 show output from the HP DeskWriter, using two brands of photocopier paper. Note the variations in clarity (darkness also varies, but it cannot be demonstrated clearly in a magazine). Figures B1 and B2 show output from the Apple StyleWriter. The crisp performance seen in Figure B2 could be achieved only with high-quality bond paper. In contrast, Figure C shows the sharp, bold output delivered by a Canon LX laser engine on the same paper that produced the poorest results with ink-jet printers.

$1999. The extra cost is easier to justify if you plan to share the printer among several machines, but most people who are shopping for a personal page printer don't have sharing in mind.

The good news is that the chasm in capabilities between PostScript and QuickDraw printers has narrowed. Apple's March release of TrueType fonts for System 6.0.7 made a difference, but ironically, Adobe deserves most of the credit. Its $99 Adobe Type Manager (ATM) utility gives QuickDraw printers access to thousands of PostScript fonts, and lets them print those fonts in almost any size. And Adobe's Type Align program works with ATM to enable you to skew and distort text, attach it to a curving baseline, and create other exotic effects that previously were beyond QuickDraw's capabilities.

Even with TrueType, ATM, and Type Align, however, QuickDraw printers deliver inferior results with PostScript-oriented drawing programs, such as Aldus FreeHand and Adobe Illustrator. Still, you can bridge even that gap by using PostScript-emulation software such as QMS's UltraScript (see "The PostScript-Emulation Approach"). Printing via a PostScript emulator is almost always slower than using a true PostScript printer, but unless you happen to be independently wealthy, printing performance often takes a back seat to affordability.

Evaluating Engines

Deciding between QuickDraw and PostScript is only half the job of finding the right printer. *Print engines,* the mechanisms that shuttle paper and produce images on it, also vary widely.

The name *laser printer* derives from the use of lasers in the print engine to expose images on photosensitive drums or belts, which then attract fine plastic toner powder and apply it to the paper. (Several so-called laser printers actually use light sources other than lasers. Technically, the correct term for all these beasts is *page printer.*) As the paper leaves the printer, a pair of heated rollers melts the powder into place, much as in a photocopier.

And like photocopiers, laser printers offer different paper-handling speeds and capacities. Personal-printer engines can push paper at 4 to 8 pages per minute (ppm). You see these higher speeds, however, only when printing multiple copies of the same document or very simple documents, such as manuscripts, in a single font and size.

As for paper capacities, most personal printers provide a single 100- to 250-sheet paper tray. Apple's Personal LaserWriter NT and Fujitsu's RX-7100PS break the pattern by providing two paper sources—handy for mixing letterhead and envelopes, or for just cutting down on feeding sessions.

Speaking of feeding, a printer's toner supply requires replacement every few thousand pages. Some manufacturers supply multipart kits that can lead to messy spills.

Canon-built engines, which are found in Apple, QMS, and Hewlett-Packard printers, use a convenient, single-cartridge system. Although these disposable cartridges are an environmentalist's nightmare, you can recycle cartridges—and save money in the process. (For recycling information, try the American Cartridge Recycling Association [305/539-0701] or the International Computer Products Remanufacturing Association [503/222-3215].)

Judging Performance Factors

A printer's controller and its engine each play a role in determining general performance. Therefore, you should consider the types of documents you plan to print, then choose the printer whose controller and engine suit those jobs best.

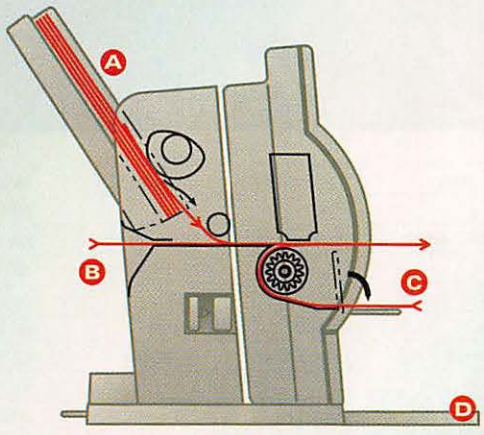
With QuickDraw printers such as Apple's Personal LaserWriter LS and SC and GCC's PLP II and IIs, your job is relatively easy. Because the Mac acts as the controller, the printer's speed at handling complex jobs containing lots of fonts and graphics depends on the speed of the Mac. If such jobs slow the printer to a crawl, you can boost performance by endowing the Mac with more memory or an accelerator board upgrade. (The upgrades pay performance dividends even when you aren't printing.)

THE INK-JET CHALLENGE TO LASER PRINTERS

Ink-jet printers straddle the fence between laser printers and inexpensive dot matrix printers. Like a dot matrix printer, an ink-jet printer contains a simple print mechanism, the core of which is a print head that glides back and forth, applying ink as the paper advances. A dot matrix print head uses fine wires that strike an inked ribbon to transfer ink to the page, whining all the while. In contrast, an ink jet silently sprays fine streams of ink at the paper (see "Inside an Ink-Jet Printer").

Like a laser printer, an ink-jet printer is a nonimpact device. It can't print on multipart forms. A more important similarity is that ink jets can produce laserlike resolution.

Still, ink-jet output isn't in the laser league. Up close, the naked eye easily discerns sloppy character edges created by ink seeping into the paper's fibers as it dries. Also, scanned images and large black areas show a mottled look. You can minimize these flaws by photocopying printed pages, but be patient—it's easy to smear ink-jet output in its first few seconds of life.



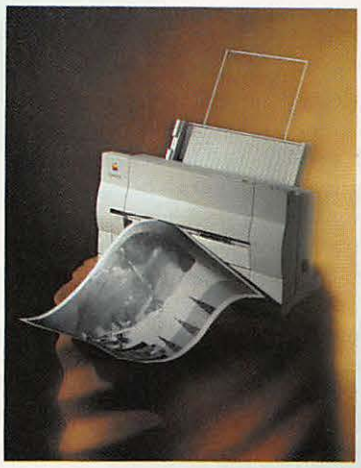
Apple's StyleWriter offers three distinct paper paths. For multipage documents, the detachable sheet feeder **(A)** holds up to 50 pages. You can feed in card stock or envelopes from the rear of the printer **(B)**, with or without the sheet feeder in place. For single pages of standard-weight paper, a front-feeding slot **(C)** starts the page on its round-trip through the mechanism. In all cases, finished pages fall into a retractable output tray **(D)**.

Today's ink-jet printers no longer require special paper, as did some pioneering models of the mid-'80s, but they are still more finicky than lasers. Apple's StyleWriter and Hewlett-Packard's DeskWriter can't handle heavy card stocks and can't automatically feed multiple envelopes. Output quality also varies dramatically depending on the quality of paper you use (see "Seeing Is Believing"). And be advised: most personal laser printers churn out several pages in the time an ink-jet printer produces one.

The StyleWriter and HP's DeskWriter are the only two Mac-specific ink-jet printers that produce 300-dpi or sharper output. (GCC's 3-pound, $549 WriteMove prints 192 dpi.) The StyleWriter retails for $599, and strong initial demand will probably keep street prices nearly that high. The DeskWriter retails for $995, but street prices hover around $700.

Last May, HP equipped the DeskWriter with an AppleTalk connector, allowing it to be shared on a network. The StyleWriter lacks this capacity. It connects via a serial cable to the Mac's modem or printer port. Neither printer supports background printing under MultiFinder, but both are compatible with third-party spoolers.

The DeskWriter includes four font families (Compugraphic versions of Helvetica, Times, Courier, and Symbol); an optional font pack includes seven additional families. All fonts are outlines, and HP's easily installed driver software can scale them to any size up to 250-point. The printer also works so well with Adobe Type Manager that some mail-order firms sell the pair together.



Apple StyleWriter

The StyleWriter—also ATM-compatible—includes the same four font families, but the fonts are Apple TrueType outline fonts, which can be scaled to sizes larger than 250-point.

In tests performed by Macworld Lab on a prototype, the StyleWriter ran at about half the speed of the DeskWriter—hardly a rocket itself. If you seek portability, however, consider this: when Apple previewed the 5-pound StyleWriter for *Macworld,* the product manager unveiled the printer by pulling it out of a DeskWriter's case.

The StyleWriter also holds another important edge: its 360-dpi resolution produces output noticeably sharper than that of a DeskWriter. Still, the StyleWriter falls short of the deep, rich blacks that laser printers provide. And a moistened finger can smear StyleWriter output like tears smear mascara.

The StyleWriter's lower price, TrueType fonts, and higher resolution make it the better printer, but the DeskWriter isn't out of the running. The StyleWriter's product manager acknowledges that HP's latest inks are less prone to smearing. And although the DeskWriter is far too slow to serve a large network, it can keep up with a couple of patient small businesses.

With PostScript printers, the Mac's speed plays a very small role in determining performance. If you print short but complex documents—lots of fonts and sizes, large scanned images, PostScript graphics—a printer with a fast controller, such as QMS's PS 410, will outperform a printer with a slower controller but a fast engine, such as GCC's BLP IIs. For simple but lengthy documents—manuscripts, personalized form letters—a printer with a fast engine serves you better (see "Personal Printer Performance").

Optimal Control

Several factors influence the performance of a PostScript printer's controller. The type of central processing unit used in the controller and the speed at which it runs govern how quickly the controller performs the many calculations involved in producing a page. Nearly all personal PostScript printers use a Motorola 68000 CPU running at speeds of between 10MHz and 16MHz. (QMS's swift little PS 410, however, uses the faster 68020, often found in higher-priced lasers, including Apple's LaserWriter IINTX.)

The controller's internal memory also influences performance. More memory allows faster service on typographically complex documents, because the printer can retain, or *cache,* more character bitmaps, eliminating the need to reconstruct those characters from the original font outlines if they're needed again. More memory also allows the printer to hold more *downloadable* fonts—those stored on the Mac's hard drive and transferred to the printer during the print job.

Built-in memory gains importance when mixing downloadable PostScript fonts and TrueType outline fonts. In System 7.0, Apple's TrueType *rasterizing* software (which generates characters in the sizes needed for a given page) will download into a PostScript printer's memory during the print job. The TrueType rasterizer requires about 50K of printer memory, leaving less room for downloadable PostScript fonts. The memory crunch hits hardest in the 1.5MB version of the TI's microLaser.

Adobe Systems continually refines the PostScript-interpreter software sold to printer vendors. The latest PostScript versions usually include the Adobe Type Manager font rasterizer. All else being equal, a printer that contains ATM routines prints text faster than one that doesn't.

(Incidentally, do not confuse the ATM rasterizing routines with the ATM utility mentioned earlier. The ATM utility runs on the Mac and provides sharp characters for the screen and for QuickDraw printers. ATM rasterizing software resides in a PostScript printer's controller.)

Low-Budget PostScript

Do not rule out the PostScript clones—printers that understand PostScript but use non-Adobe PostScript interpreters. In the personal printer market, such clones include Abaton's LaserScript; Qume's CrystalPrint Publisher II; and the forthcoming Microtek TrueLaser, Abaton LaserScript LX, and LaserMax Systems' LaserMax 400. Clone vendors usually claim faster performance than that of even the high-end Adobe PostScript printers, such as Apple's LaserWriter IINTX.

Reality sometimes betrays those claims. In my experience, PostScript

PERSONAL PRINTER PROFILES

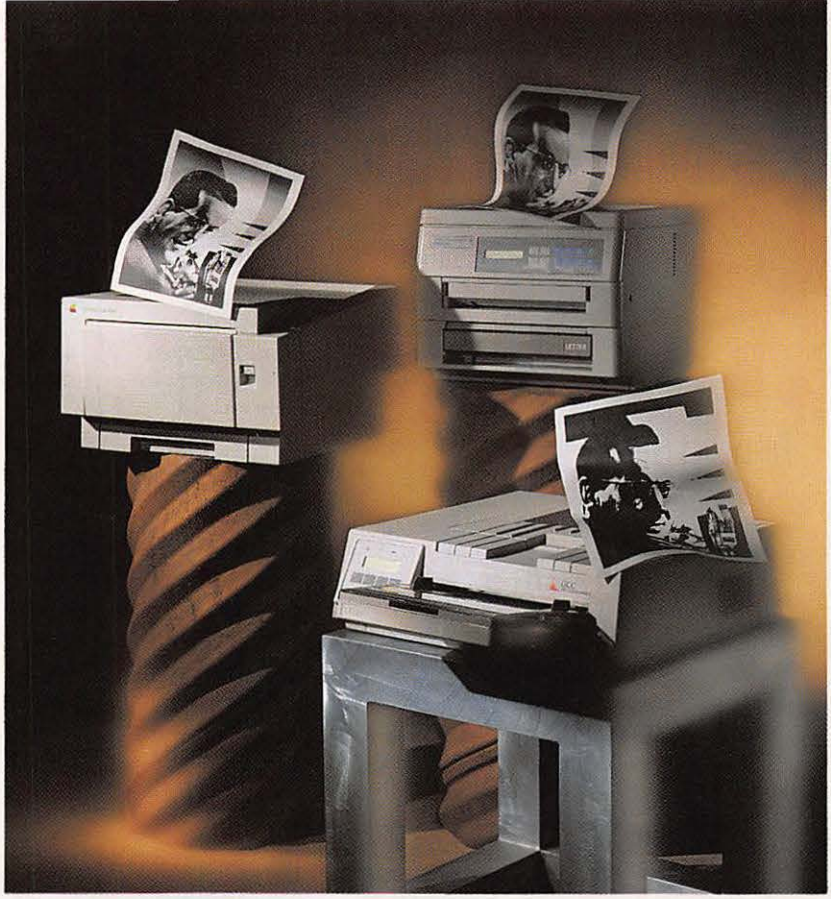
	Abaton LaserScript	Apple Personal LaserWriter LS	Apple Personal LaserWriter NT	Apple Personal LaserWriter SC	Fujitsu RX7100PS	GCC BLP IIs[1]	GCC PLP II[2]
SPECIFICATIONS							
Imaging language	PostScript-compatible	QuickDraw	PostScript 51.8	QuickDraw	PostScript 50.3	PostScript 52.3	QuickDraw
Uses Adobe PostScript interpreter	no	NA	yes	NA	yes	yes	NA
Processor/speed	NS32CG16/15MHz	NA/NA	68000/12MHz	68000/7.45MHz	68000/12.5MHz	68000/16MHz	NA/NA
Number of included fonts	35	13	35	4	35	35	22
Memory in base model	3MB	512K	2MB	1MB	2MB	2MB	none
Memory expansion upgrades	to 6MB	none	to 8MB	none	to 4MB	to 4MB	to 1MB
Print engine	TEC 1305	Canon LX	Canon LX	Canon LX	Fujitsu M3701	Oki OL-800	Oki OL-400
Maximum speed (in ppm)	6	4	4	4	5	8	4
Paper capacity (in sheets)	150	50	main tray, 250; multipurpose tray, 50	main tray, 250; multipurpose tray, 50	each tray, 150 (two trays total)	200	200
Consumable components	toner cartridge, drum unit	drum and toner cartridge	drum and toner cartridge	drum and toner cartridge	process cartridge, ozone filter	toner, EP magazine	toner, EP magazine
Pages between replacement	toner cartridge, 1500; drum unit, 10,000	3500	3500	3500	cartridge, 6000; filter, 36,000	toner, 2500; EP magazine, 15,000	toner, 2500; EP magazine, 15,000
Cost of replacement	toner cartridge, $45; drum unit, $150	$99	$99	$99	cartridge, $185; filter, $15	toner, $33; EP magazine, $289	toner, $33; EP magazine, $289
Optional paper accessories	Legal and envelope cassettes	Legal and envelope cassettes; 250-sheet tray	Legal and envelope cassettes	Legal and envelope cassettes	face-up stacker	Legal, A4, B5, and envelope cassettes	Legal, A4, B5, and envelope cassettes
List price	$2995	$1299	$2599	$1999	$3190	$2899	$999

[1] This printer is also available in 4-ppm model, called the BLP II, for $1999. [2] This printer is also available in 8-ppm model, called the PLP IIs, for $1499.

clones are faster for typographically complex documents and object-oriented (MacDraw-type) graphics but lag when printing bitmapped graphics, especially scanned images.

In the past, PostScript clones had serious problems handling *Type 1* fonts, the downloadable font format used by Adobe and many other font developers. Type 1 fonts contain instructions that the printer's controller uses to optimize the appearance of each character at a given size. Adobe encrypts these instructions, also called *hints*, and clone developers were loath to crack the code, fearing lawsuits from Adobe.

Adobe recently published most of the Type 1 specifications, however, and clone vendors have decrypted most hints. Today's PostScript clones still don't handle Adobe Type 1 fonts as skillfully as Adobe PostScript interpreters do, but the differences are becoming difficult to discern, even under magnification.



Tough competitors: Clockwise from top, the Texas Instruments microLaser PS35, the GCC PLP II, and the Apple Personal LaserWriter NT.

PC Patch Jobs

Laser and ink-jet printers designed for the IBM PC world often cost considerably less than their Macintosh-specific cousins. If you're willing to stray from the pack and deal with occasional incompatibilities, you can get that laser look by using a PC scribe with a Mac. You merely need the proper cable, and driver software that the PC printer can understand.

For software, use a QuickDraw-based driver package such as JetLink Express or MacPrint, or a PostScript emulator such as QMS UltraScript.

In the past, third-party PC printer drivers experienced serious application compatibility problems when connected to Macintoshes. Fortunately, with the proliferation of QuickDraw-based laser and ink-jet printers, application developers have begun to adapt to Apple's programming guidelines. But pages of caveats and workarounds still pollute the JetLink Express and MacPrint manuals, so verify compatibility with your favorite programs before you buy.

	HP LaserJet IIP (HP PostScript)	NEC Silentwriter 2 Model 90	Okidata OL840 LED Page Printer	QMS-PS 410	Texas Instruments microLaser PS35
	PostScript 52.2	PostScript 52.2	PostScript 51.8	PostScript 52.4	PostScript 52.1
	yes	yes	yes	yes	yes
	68000/10MHz	68000/16MHz	68000/12MHz	68020/16MHz	68000/12MHz
	35	35	35	45	35
	2MB	2MB	2MB	2MB	1.5MB
	to 4.5MB	to 4MB	to 4MB	to 6MB	to 4.5MB
	Canon LX	Minolta	Oki OL-800	Canon LX	Sharp 9500
	4	6	8	4	6
	50	250	200	50	250
	drum and toner cartridge	EP cartridge	toner, EP magazine	toner and drum cartridge	OPC cartridge, developer, toner
	3500	6000	toner, 2500; EP magazine, 15,000	3500	OPC cartridge, 40,000; developer, 20,000; toner, 3000
	$99	EP cartridge, $240	toner, $33; EP magazine, $289	$99	OPC cartridge, $189; developer kit, $149; toner kit, $69
	250-sheet cassette	face-up stacker	second 200-sheet tray	250-sheet cassette	second tray, envelope feeder
	$2195	$2495	$2995	$2795	$2849

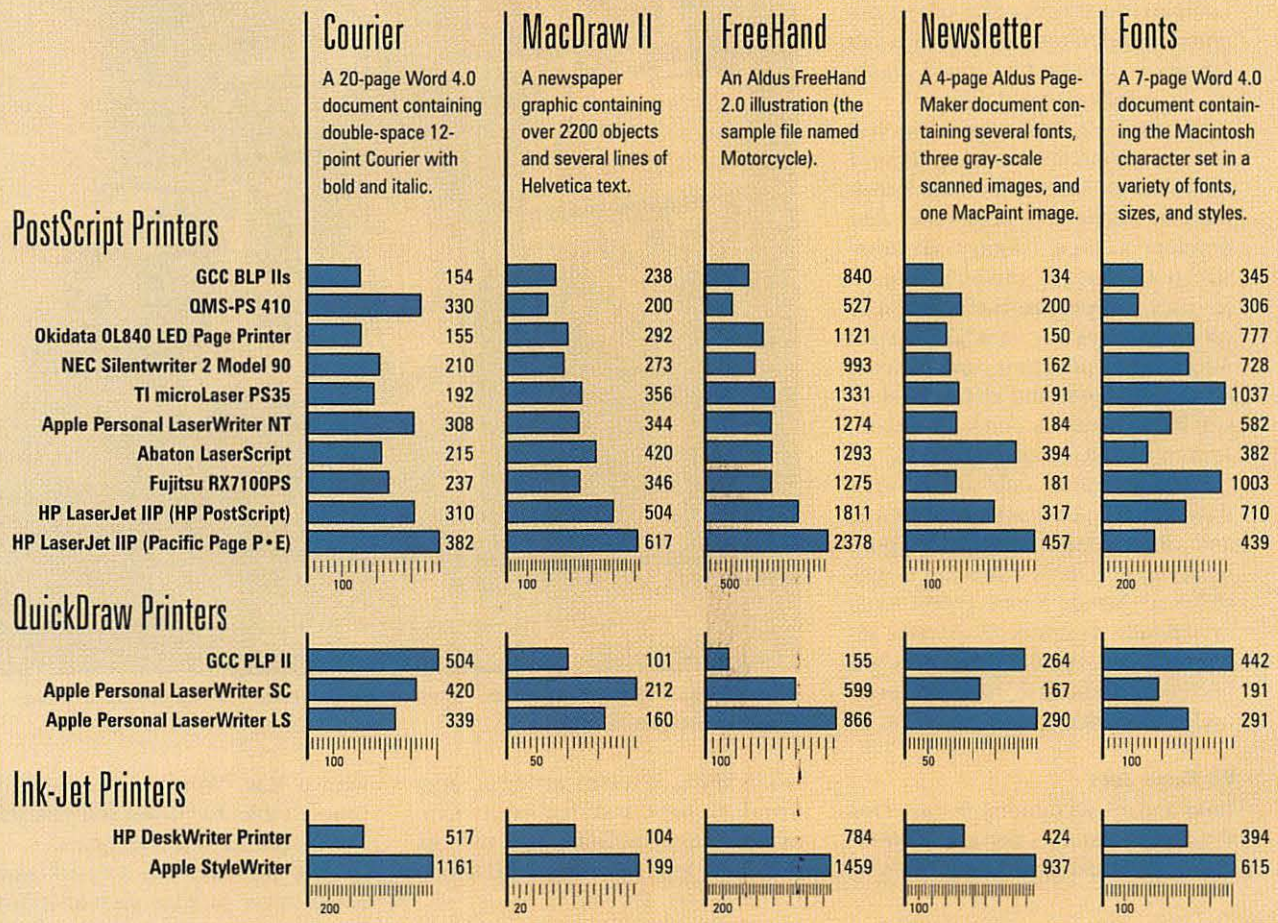
Personal Picks

Among the printers I evaluated, one stands above the rest: the $2795 QMS-PS 410. The PS 410 combines the easy-to-set-up Canon LX engine with a 16MHz, 68020-based controller that handles complex documents as swiftly as a $5999 LaserWriter IINTX. The QMS-PS 410 also includes excellent documentation.

This machine works seamlessly for offices with both Macs and PCs,

Personal Printer Performance

All times are in seconds

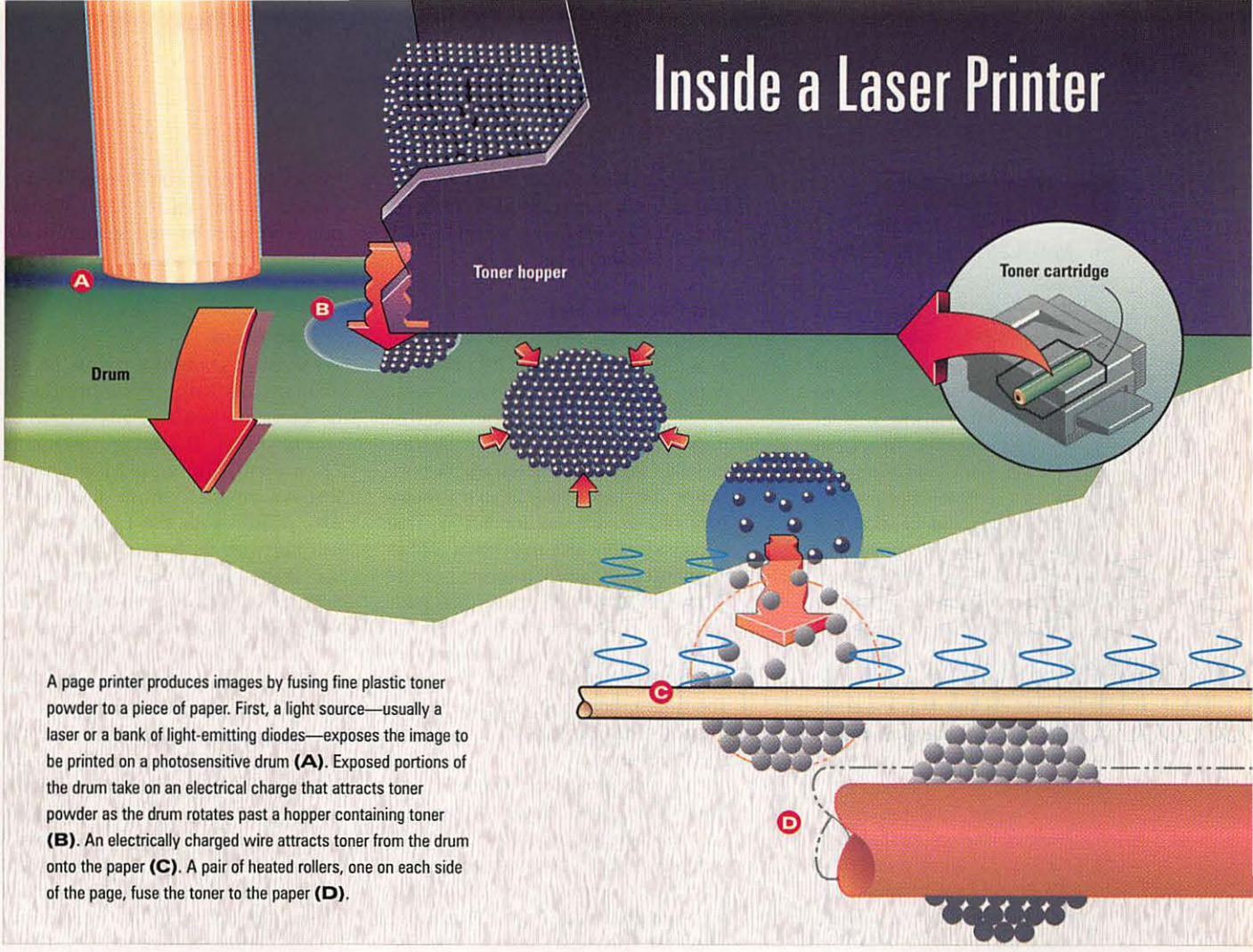


Be aware that speed and print quality often conflict. For example, the GCC PLP II boasts by far the fastest performance on the FreeHand test—but produces output inferior to that of most other printers tested. With QuickDraw printers, speed varies directly with the speed of the Mac running the printer. For these tests, we used a Mac II with 5MB of RAM, MultiFinder turned off, and no cache.

RATING PERSONAL PRINTERS

	Abaton LaserScript	Apple Personal LaserWriter LS	Apple Personal LaserWriter NT	Apple Personal LaserWriter SC	Fujitsu RX7100PS	GCC BLP IIs[1]	GCC PLP II[2]	HP LaserJet IIP (HP PostScript)	NEC Silentwriter 2 Model 90	Okidata OL840 LED Page Printer	QMS-PS 410	Texas Instruments microLaser PS35
SUBJECTIVE RATINGS												
Ease of setup	3	4	4	3	2	3	3	2[3]	4	3	4	3
Ease of replacing consumables	3	4	4	4	3	3	3	4	4	3	4	3
Ease of printing envelopes	4	4	4	4	2	4	4	4	4	4	4	4
Documentation	4	not released	4	4	2	4	4	4	4	2	4	4
Quality of support disks	3	not released	4	4	4	4	4	4	4	1	4	4
SUITABILITY-TO-TASK RATINGS												
Simple text documents	4	4	3	3	4	4	3	3	4	4	3	4
Complex text documents	3	3	3	2	2	3	3	2	2	2	4	3
Complex QuickDraw illustrations	2	4	3	3	3	3	3	2	3	3	4	3
Complex PostScript illustrations	2	1	2	1	2	3	1	2	3	2	4	2
Documents containing Type 1 fonts	2	1	4	1[4]	4	4	1[5]	4	4	4	4	4
Desktop publishing	1	2[5]	3	1[6]	3	4	1[5]	2	3	3	3	3

[1] This printer is also available in 4-ppm model, called the BLP II, for $1999. [2] This printer is also available in 8-ppm model, called the PLP IIs, for $1499. [3] 4, with HP Macintosh bundle, in which memory and interface are factory installed. [4] 4, when used with Adobe Type Manager. [5] 3, when used with Adobe Type Manager; 1, if PostScript graphics are required. [6] 3, when used with Adobe Type Manager. 1= poor; 2 = fair; 3 = good; 4 = excellent.



thanks to its ability to switch automatically between PostScript and HP LaserJet emulation mode depending on the type of data it receives. (With other PostScript printers, you need to flick switches or send special software codes to change between PostScript and HP emulation.) In short, the PS 410 printer has it all—almost.

The printer holds only 50 sheets of paper, unless you buy the optional 250-sheet tray for $195. And you may find the QMS-PS 410's 4-ppm engine too slow for typographically simple documents or multiple copies of the same document.

For such applications, I recommend GCC's $2899 BLP IIs. Its controller competes poorly against the PS 410, but an 8-ppm engine gives the BLP IIs the edge on routine jobs. Okidata's $2999 OkiLaser 840 uses an identical engine but was slower in most tests.

The BLP IIs and its 4-ppm cousin, the $1999 BLP II, are also the only personal PostScript printers now available that provide a SCSI connector for attaching a font-storage hard drive. Indeed, if you use droves of downloadable fonts, a BLP II with a hard drive could prove faster than the PS 410, as the hard drive would eliminate font-downloading time.

For a less expensive PostScript-based machine, consider GCC's 4-ppm BLP II ($1999), or TI's 6-ppm microLaser. Mail-order houses often discount the microLaser PS17, which contains 17 fonts, to as low as $1700. I have seen the 35-font version for $1995. The microLaser's swift controller (the latest models include the ATM rasterizer) and its 6-ppm engine provide balanced performance for any type of job.

As for the QuickDraw printers, it's a tougher call. The $999 PLP II has a substantial retail price edge over the $1299 Personal LaserWriter LS. On the street, however, prices may be closer, given that many Apple dealers offer discounts in the 20 percent ballpark. GCC has a smaller dealer network and primarily sells its products directly through mail orders. But shop around—if your area has a GCC dealer, you may find the PLP II for less than $999.

The Personal LaserWriter LS costs more than the PLP II, but offers more. Although the LS holds less paper (unless you buy the optional 250-sheet tray), it features a superior engine. And the printer is easier to set up, thanks to its use of a serial cable instead of the SCSI connection scheme used in the PLP II series and in Apple's Personal LaserWriter SC.

The LS's printer driver is also more smoothly integrated into the Mac environment. You can print in the background under MultiFinder, and you never have to endure the two-step printing process that the PLP driver imposes on you when memory is tight. The prototype LS tested by Macworld Lab was faster than the PLP II in text-oriented tasks, but slower when printing graphics.

Still, choosing an LS means living with limitations. You can upgrade each PLP to a PostScript-based BLP for $999; no such upgrade will be offered

THE POSTSCRIPT-EMULATION APPROACH

A PostScript-emulation program resides on a Mac's hard drive and acts as an intermediary between your programs and a non-PostScript printer. When you choose Print, the emulator saves the PostScript instructions from the LaserWriter driver on the hard drive. The emulator's interpreter then takes over, translating the file into instructions the printer can understand. A PostScript emulator's performance depends on the Mac's performance, and machines below the Mac II–class can tax your patience.

I tested TeleTypesetting's T-Script, Custom Applications' Freedom of Press, and QMS's UltraScript Plus. All three support dozens of output devices, from dot matrix printers to ink jets to lasers. All three can act as print servers for a network. You can use another Mac's Chooser to select the emulator's driver, and then print as though you were printing to a LaserWriter.

Overall, of the three products, UltraScript Plus is the easiest to use and the most reliable (see "Ranking PostScript-Emulation Software"). If you have several megabytes of memory, UltraScript Plus works transparently under MultiFinder. There is one small drawback, however: to use Type 1 fonts, you must first convert their files using an included utility.

An emulator is also a great way to put an underused ImageWriter to work for proofing. There is nothing like a real PostScript printer, but an emulator, especially UltraScript Plus, comes surprisingly close—for a lot less cash.

for the LS. And if your Mac's modem and printer ports are already occupied, you'll need to buy a serial switch box to accommodate an LS.

Last-Place Finishers

Are there any printers you should avoid? The HP LaserJet IIP comes to mind. In February, HP announced a LaserJet IIP Macintosh bundle that includes the printer with a factory-installed AppleTalk interface, a PostScript cartridge, and an extra megabyte of memory—all for $2195. That is considerably less than what a Mac-configured IIP used to cost, but the printer's performance still taxes my patience. Consider the GCC BLP II ($1999) or Apple Personal LaserWriter NT ($2599) instead. Both are faster and hold more paper, and the BLP II provides a SCSI port for a font-storage hard drive.

I would also steer clear of Pacific Data's $695 Pacific Page P E cartridge and its cumbersome PacificTalk interface, which work with the entire HP LaserJet series. The clone interpreter in the Pacific Page P E cartridge generally provides inferior performance compared to HP's Adobe PostScript cartridge, as the benchmarks in "Personal Printer Performance" show. Pacific Data has announced an enhanced version of the product, but it was not yet shipping at press time.

Looking Ahead

While the original version of the Abaton LaserScript is another dud, a new version should be available when you read this. The $1995 LaserScript LX will provide emulation-sensing features similar to those of QMS's PS 410. Abaton says the LaserScript LX will be twice as fast as its predecessor. If the claim holds up, the LaserScript LX may become the best buy among personal PostScript clones.

A few other printers were in development at press time, and they should be on the market soon. Microtek's $2995 TrueLaser will be the first printer to combine Microsoft's PostScript-compatible TrueImage language and Apple's TrueType outline fonts. With a 6-ppm engine and a controller built around the AMD 29000—the same microprocessor that drives Apple's graphics accelerator board—TrueLaser should zip. But it will be a PostScript clone, so you will want to evaluate how well it handles Type 1 fonts.

Another TrueImage-based printer, LaserMax Systems' LaserMax 400, is the first 400-dpi printer built around the Canon LX engine. With a retail price of $1995, it sounds unbeatable. Still, there are catches. The printer's controller resides not within the printer, but on a NuBus expansion board that you must plug into a member of the Macintosh II family. Thus, you cannot use the LaserMax 400 with a compact Mac or an LC unless your network has a Mac II containing the printer's controller board. Unlike Microtek's TrueLaser, the LaserMax 400 doesn't contain Apple's True-

RANKING POSTSCRIPT-EMULATION SOFTWARE

	Freedom of Press 3.0	T-Script Basic 1.3	UltraScript Mac+ 1.03
SPECIFICATIONS	Custom Applications	TeleType-setting	QMS
Disk space required	4MB	1.1MB	4MB
Memory required	2MB	1MB	1.5MB
Compatible with Type 1 fonts	yes[1]	yes[1]	yes[2]
Fonts included	35	17	43
Page preview window	no	yes	no
List price	$495[3]	$145	$495[4]
SUBJECTIVE RATINGS			
Ease of installation	2	2	3
Ease of use	2	2	4
Reliability	2	3	3
Documentation	2	2	3
Overall ratings	2	2	3

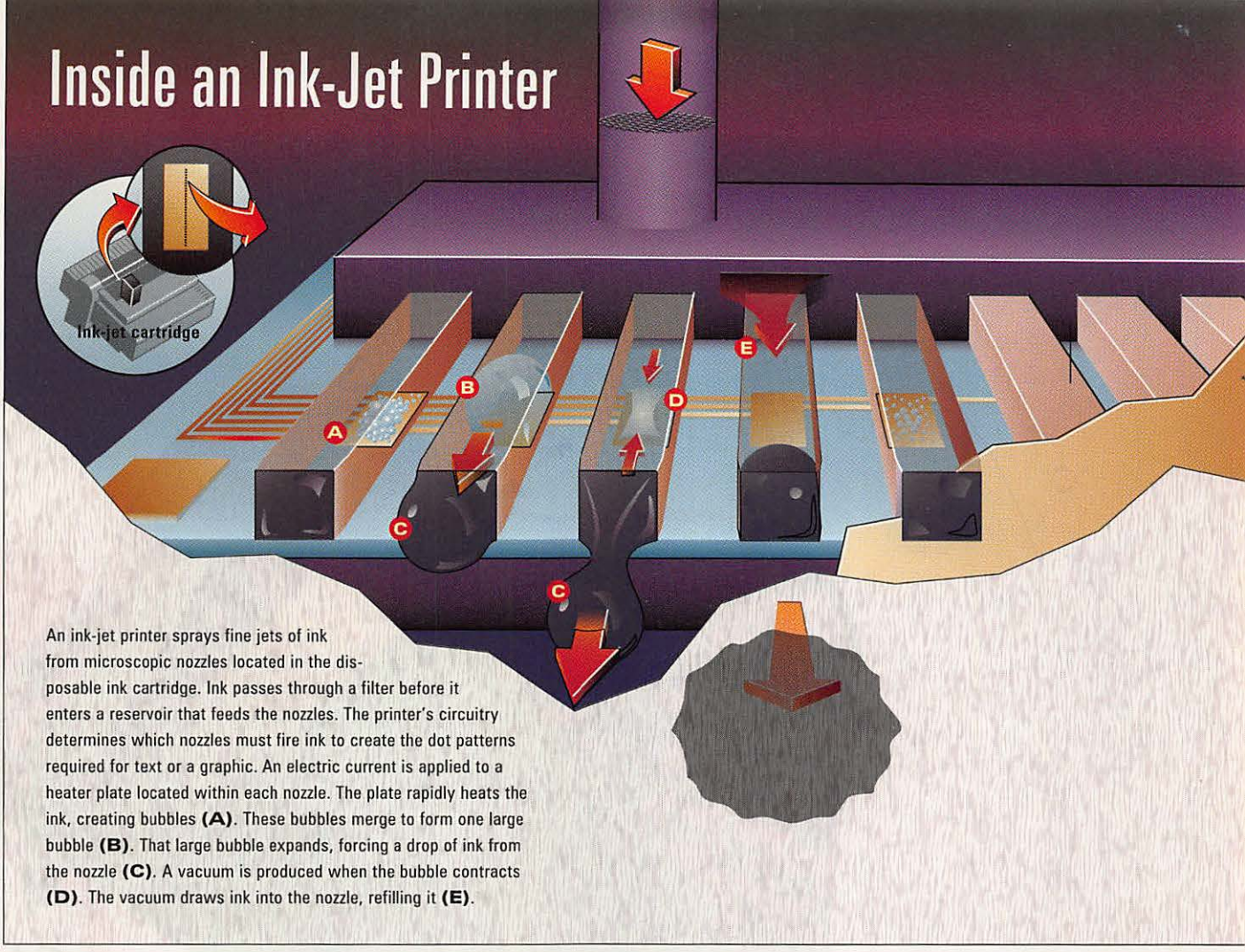
[1] This product compatible only when used with Adobe Type Manager.

[2] Type 1 font files must be converted using included utility.

[3] Freedom of Press Light costs $98, includes 17 fonts, and supports fewer printers.

[4] UltraScript costs $195, includes 15 fonts, and lacks network printing.

1 = poor; 2 = fair; 3 = good; 4 = excellent.



An ink-jet printer sprays fine jets of ink from microscopic nozzles located in the disposable ink cartridge. Ink passes through a filter before it enters a reservoir that feeds the nozzles. The printer's circuitry determines which nozzles must fire ink to create the dot patterns required for text or a graphic. An electric current is applied to a heater plate located within each nozzle. The plate rapidly heats the ink, creating bubbles **(A)**. These bubbles merge to form one large bubble **(B)**. That large bubble expands, forcing a drop of ink from the nozzle **(C)**. A vacuum is produced when the bubble contracts **(D)**. The vacuum draws ink into the nozzle, refilling it **(E)**.

Type fonts. Instead, LaserMax will include 50 of its own fonts with the printer, which the company describes as compatible with TrueType and Type 1 fonts.

New printers from Sharp Electronics Corporation and Epson are shipping now, but were not available in time to test for this article. The Sharp JX-9500PS uses the same 6-ppm engine found in TI's microLasers. With a retail price of $3195, the JX-9500PS occupies the upper end of the personal-printer spectrum. But expect middle-of-the-pack performance from its 12MHz, 68000-based controller.

Epson, a name synonymous with dot matrix printers, has entered the laser field with a bang. Its $3299 EPL-7500 uses a 6-ppm Minolta engine and a controller built around a lightning-fast Weitek 8200 RISC processor, which also powers Qume's swift CrystalPrint Publisher II. While the Qume machine is a PostScript clone, Epson uses an Adobe interpreter. NewGen Systems has announced but is not yet shipping its TurboPS/400p, listed at $2995; and its TurboPS/300p, at $2495. The printers will offer 400-dpi and 300-dpi resolution, respectively. Resolution will be enhanced, the company says, by proprietary, ROM-based software. NewGen will also use RISC-based controllers, but will rely on a relatively slow, 4-ppm Canon engine.

The hottest new offering may be Dataproducts' $2995 LZR-660, a 6-ppm printer that, like the EPL, employs the Weitek processor. The LZR-660 also contains Adobe's Level 2 PostScript—which, among other things, runs considerably faster than the Level 1 PostScript in use today. The LZR-660 uses the same Sharp engine as TI's microLasers, and provides a SCSI port for a font-storage hard drive.

What of the more-distant future? Prices fell dramatically in the last year. Will we see similar reductions this year, creating a new generation of personal lasers printers priced in the three-figure range? Don't bet on it. True, GCC broke the $1000 barrier when it cut the PLP II's price to $999, but that marketing move was necessary to keep the printer competitive with Apple's technically superior Personal LaserWriter LS. The rumor mill suggests that Hewlett-Packard will release a less-expensive replacement for the IIP. Add memory, PostScript, and AppleTalk, though, and watch the price rise into today's range.

Page printers are just too complex for prices to fall much further—at least for the next couple of years. If you want 300 dpi for three figures, and the PLP II doesn't impress you, think ink jet. ■

See *Where to Buy* for contact information.

Contributing editor and columnist ***Jim Heid*** *has worked with nearly 50 laser printers since 1984. His latest book is* Macworld's Complete Mac Handbook, *an expanded and updated collection of his* Getting Started *columns, published this spring by IDG Books Worldwide.*

A HANDS-ON GUIDE TO INSTALLATION



Working with FONTS



By Erfert Fenton

My friends are always calling me up in the middle of the night with crises. Not relationship crises, or career crises, or midlife crises, but something far more serious: font-installation crises. Although installing Mac fonts isn't hard, it isn't as easy as, say, dragging an icon into the System Folder—yet.

If you are new to Macintosh fonts, or even if you have installed plenty of fonts but are looking for ways to save disk space, unclutter your font menu, speed up printing, or simply make installing fonts more painless, the following tips can help.

Font Ins and Outlines

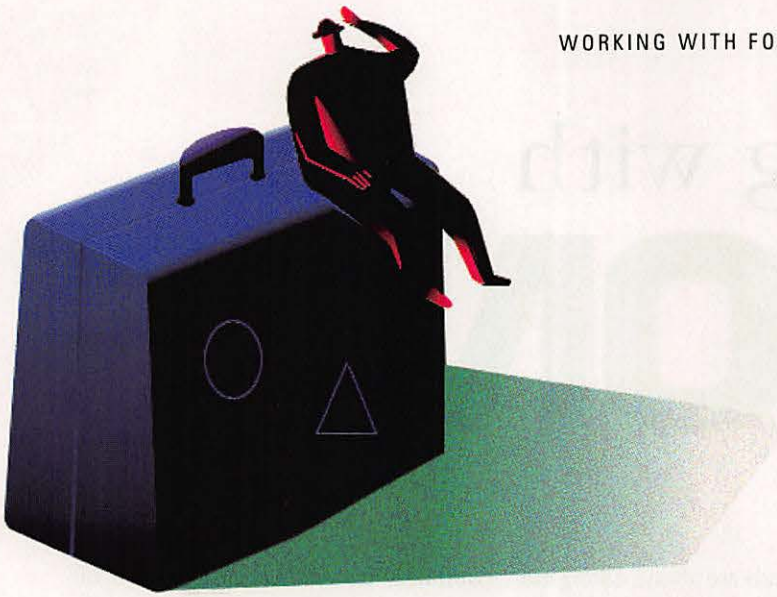
You may know the basics of Macintosh fontology by now, but in case you don't, here is a brief introduction. The characters you see on the screen are called—believe it or not—*screen fonts* (they are also known as *bitmapped fonts*). Screen fonts come packed in a suitcase icon, and you typically install them in the Mac's System file with Apple's Font/DA Mover utility.

Screen fonts are composed of bitmapped images that have been tailored to approximate the letterforms of a typeface as closely as possible on a 72-dpi screen. Although screen fonts make on-screen type look better, they are not required for printing. As long as one screen font is available, the system will print all sizes.

For PostScript printers, each screen-font style (bold, italic, and so on) has a corresponding *printer font* (also called an *outline font*). PostScript scales a given outline to come up with characters of whatever size you request at print time. QuickDraw printers don't use outlines, but instead scale down bitmapped fonts to make them look crisp when printed at the printer's maximum resolution—usually 300 dots per inch. Different QuickDraw printers use different scaling ratios; for example, some need a bitmapped font three times larger than the size to be printed, while others need one that's four times larger.

While PostScript printers contain a set of *resident* fonts (that is, fonts that live in the memory of the printer itself), additional fonts must be *downloaded* to the printer's memory. In most cases, applications automatically download fonts, which means the fonts you use in a document are sent to the printer with no effort on your part; once a printing job's done, the downloaded fonts are flushed from the printer's memory. To improve printing speed, you can use a utility like Adobe's Font Downloader, Apple's LaserWriter Font Utility, or Linotype's Linotype Font Utility to *manually download* one or more fonts to the printer. Unlike automatically downloaded fonts, manually downloaded fonts stay in the printer's memory until you turn off the printer. Although manually downloading fonts takes some time and effort on your part, the improvement in printing speed can be worth the trouble. For example, if you use a certain set of fonts in all your documents, you should manually download them when you start the day. The fonts will be printed as quickly as if they resided in the printer, rather than having to crawl through AppleTalk from your Mac to the printer. The number of fonts you can download at once depends on a number of factors, including the amount of memory the printer has, the application used to create the document, the complexity of the pages being

MICK WIGGINS



printed, and even the point size of the faces you're using. As a rule of thumb, you can download 4 to 6 fonts to an original LaserWriter, and 7 to 10 to a LaserWriter IINTX. If you consistently use a large number of downloadable fonts, you might consider placing them on a hard drive attached to your printer. Fonts downloaded in this way remain on the printer's hard drive until you remove them.

If you've ever installed fonts on a Mac, you've used Apple's Font/DA Mover, a utility that fills many people with fear and loathing. First, the good news: in the near future, many people will be freed forever from the Font/DA Mover. System 7 will do away with the need for this pesky utility and make font installation much easier (see "A New System"). And Adobe, which beat Apple to the punch on scalable screen fonts with Adobe Type Manager (ATM), has done it again with Font Porter, a simple font-installation utility included with ATM 2.0 (see "Scenario 2: ATM").

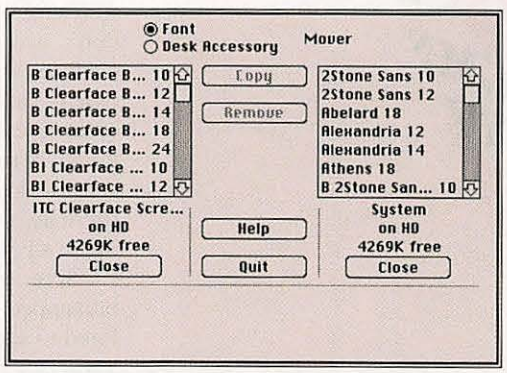
Now the bad news: not everyone will escape Font/DA Mover. System 7 will require 2MB of RAM to run, so owners of modest equipment will be stuck with Apple's old system software and utilities. Owners of Macs not equipped with System 7 can avoid the Font/DA Mover blues by purchasing ATM 2.0 or a font/DA extender (described below), but those options cost money.

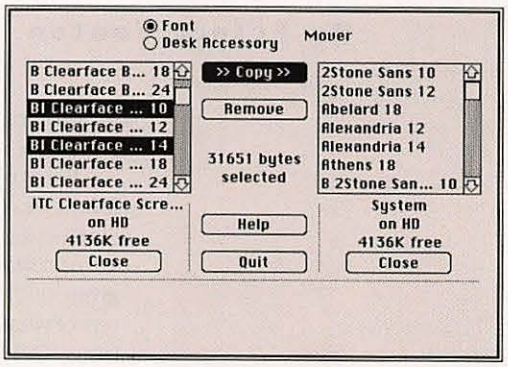
I'll be presenting four basic font-installation scenarios. If you don't intend to upgrade to System 7, or do not want to spend money on extra utilities, the first scenario is for you. It's a bare-bones approach using only Font/DA Mover. The second scenario introduces ATM, which allows you to save space on a hard drive by installing a minimal number of screen fonts. The third scenario deals with font/DA extenders, which save time, space on the hard drive, and Font/DA Mover hassles by letting you turn screen fonts on and off without installing them in the System file. A fourth and final scenario combines the approaches described in the first three to achieve optimum convenience.

For the following exercises, we'll install a set of fonts for a hypothetical newsletter: Adobe's ITC Clearface Regular, at 12-point for the text; Clearface Bold Italic, at 10-point for figure titles and 14-point for sidebar titles; Clearface Regular Italic, at 10-point for figure captions; and Bitstream's News Gothic Bold, at 18- and 14-point for two levels of headings. The exercises assume you have a hard drive, Font/DA Mover version 3.8 (if you have an earlier version, you can get 3.8 from an Apple dealer or a Macintosh user group), and several PostScript fonts. You can follow the steps outlined here if you have a QuickDraw printer, but you have to calculate which sizes to install—unless you use ATM, which takes care of font scaling for you (see "Scenario 2: ATM").

Scenario 1: Font/DA Mover

1. Place a copy of Font/DA Mover on your hard drive. Also copy a screen-font suitcase for each font you'll be installing (if you don't see any suitcases around, be sure you're in Icon view under the View menu). In this example you would





To install a new font, double-click on its icon. The Font/DA Mover window (top) will appear, listing the new fonts in the left-hand window. Locate and open the System Folder by navigating through the files and folders listed on the right. Now Shift-click on the fonts and sizes you want, and hit the Copy button. When you restart the Mac, the fonts will be installed.

copy the ITC Clearface suitcase—which contains plain, italic, bold, and bold italic styles—and the News Gothic Bold suitcase (which contains only the bold style because Bitstream's font-organization scheme differs from Adobe's) onto your Mac's drive.

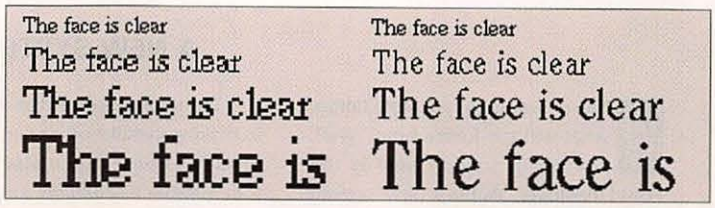
2. Double-click on the Clearface suitcase icon. The Font/DA Mover window appears, listing the suitcase's fonts in the left-hand column.

Click on the Open button beneath the right-hand column. A list of the files and folders on your hard drive appears. Locate the System Folder, open it, then open the System file, which is where you'll be placing the fonts. A list of the screen fonts already installed in your System file appears in the right-hand column.

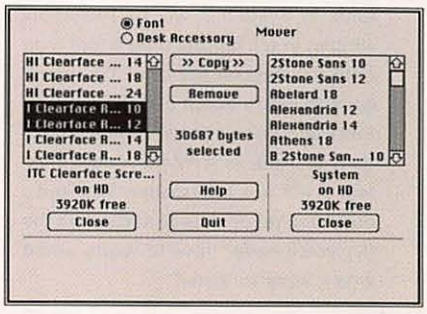
3. In the left-hand column, Shift-click on the names of the font weights and sizes you need, in this case Clearface Regular 12-point, Clearface Regular Italic 10-point, and Clearface Bold Italic 10- and 14-point. When you've selected all the screen fonts you want to install, click on the Copy button. Note that the arrows (>>) on the Copy button point toward the destination of the screen fonts—in this case, the System file.

To install additional screen fonts (in this example, Bitstream's News Gothic Bold), click on the Close button below the left-hand column, then click on Open, go to the hard drive, and select the appropriate suitcase name from the list that appears. Repeat the procedure described above. When you've installed all the screen fonts you need, click on Quit.

4. Now that you've installed the required screen fonts, you can throw away your copies of the font suitcases, which just take up space on the hard drive. Installing only the sizes you need for the newsletter conserves a considerable amount of space; the two suitcases in this example would take up a total of 818K if you installed every size and style in them; installing only the fonts you need uses just 65K.



With ATM, bitmapped fonts (left) will be smoothly scaled (right) and characters that look blocky on screen at small sizes will print well.



Space-saver ATM allows you to install only 10- and 12-point size Type 1 fonts, but you can display virtually any size.

5. Now it's time to install the corresponding printer fonts. *Install* is perhaps too intimidating a word; all you need to do is drag the printer font icon from a floppy disk for each font into the System Folder.

Leave the printer fonts loose in the System Folder; if you place printer font icons into another folder within the System Folder, the Mac won't be able to locate them when it's time to print. (Note: The utilities described in Scenario 3 let you place printer fonts in a folder, but for now just let them rattle around.)

You may notice a folder called AFM on the disk your fonts came on. AFM (Adobe Font Metrics) files contain font metrics and kerning information used by some applications, such as kerning utilities. Unless an application's manual

TAKE CONTROL OF YOUR FONT MENU

Mention the Futura family and you'll strike terror in the heart of anyone who hates yard-long font menus. Adobe's version of Futura, for example, offers 20 members, from Futura Light to Futura Extra Bold. Because of Adobe's naming strategy, the Futura family is scattered throughout a font menu under monikers like CXB Futura Co (Futura Condensed Extra Bold) and OCXB Futura C. Wouldn't it be swell if you could access all the weights you needed under the main listing, Futura? Fortunately, you have several options for doing so.

The simplest solution is to buy font families that have been merged by the manufacturer. Many font vendors now offer merged families. When you install a merged font family, only the family name (Baskerville, for example) appears in your applications' font menus. But selecting Bold, Italic, or Bold and Italic from the Style menu summons the selected style.

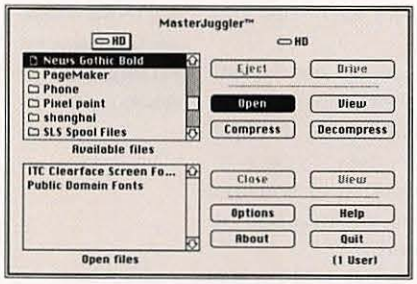
Both Suitcase II and MasterJuggler include utilities that let you place styles under a single family name. For simple families that consist of plain, bold, italic, and bold italic styles, Suitcase II's Font Harmony utility merges the styles so they appear under a single family name; you access them from a program's Style menu. MasterJuggler's Font/DA Utility takes a different approach, allowing you to rename fonts.

If a font family does not come merged, and if you do not feel like fooling around with a utility to merge it, you can take the easy way out and use Adobe's Type Reunion INIT ($65). You just drag the Type Reunion icon into the System Folder and restart. That's all. When you open an application, the Font menu lists a single name for each font family; a style submenu pops up when you select the main font name. Another option is Eastgate Systems' Fontina ($69.95), which fills your entire screen with columns of alphabetized font names.

A NEW SYSTEM

When it comes to font installation, what will the future hold? Well, one thing it won't hold is the Font/DA Mover. Apple's new system software won't require it. According to Apple's type and text product manager Jim Stoneham, installing fonts in System 7 will be incredibly simple: you'll merely drag a font icon onto the System file icon. You won't have to worry about installing screen fonts and printer fonts—one icon will do it all. And, as ATM does now, System 7 will use information in a font's outline to do on-screen scaling on the fly; you'll never have to worry about which sizes to install.

Stoneham claims that in addition to making installation easier, System 7 tools have been put in place to make font number ID conflicts a thing of the past. The potential for conflicts was already reduced when the number of available font ID numbers was changed from 256 to 32,768 some time ago. But with major players like Adobe, Bitstream, Linotype, Agfa/Compugraphic, and Monotype in the Mac font business, even 32,768 numbers are going to get used up in a hurry. Apple is encouraging developers to refer to fonts by name instead of number, which should help. Also, each TrueType font contains an internal error-detection code that's stored with any document that contains the font. It's up to developers to support this feature in their applications. Let's say you use Galliard Bold in a document and take that document to a typesetting service bureau. If you open the document there and get a checksum error, you'll know that the Galliard Bold you used is different from the one the service bureau's using. Perhaps theirs is from a different developer, or perhaps you changed some kerning information in your version. Whatever the problem, you can try and track it down before wasting money on unusable output.





MasterJuggler (top) and Suitcase can compress fonts by up to 50 percent, then automatically decompress a suitcase when you use its fonts. You can reclaim disk space by closing a seldom-used font suitcase in Suitcase (bottom) or Master-Juggler, then removing your copy of the font from the hard drive.

tells you to install AFM files, ignore them.

Scenario 2: ATM

Using the Font/DA Mover to install all the screen font sizes you need is the cheapest way to go, since the Font/DA Mover is included with Apple's System utilities. If you use dozens of fonts, however, the approach just described will strain your hard drive capacity. By employing Adobe Type Manager ($99), you can install only a single size of each font and let ATM scale the characters for screen display and QuickDraw printing (Adobe suggests you install two sizes per font—say, 10 and 12 points—for optimum scaling). The other benefit, of course, is that ATM improves the appearance of fonts on screen.

Because ATM scales fonts to virtually any size, you have to install fewer screen fonts to display typical sizes like 18- and 24-point, and you can invoke previously undisplayable sizes like 38- or 75-point. And ATM saves owners of QuickDraw printers such as the Apple Personal LaserWriter SC or the GCC Personal LaserPrinter the trouble of installing the correct sizes for scaling.

While the original release of ATM supported only Adobe-licensed Type 1 PostScript fonts, a subsequent release took care of that limitation, so ATM now works with other vendors' Type 1 fonts. If you have Type 3 fonts, you can use a utility such as Altsys's Metamorphosis or Image Club's Evolution to convert them to Type 1 format. And while some users complained that ATM's on-the-fly font scaling was more like on-the-crawl, the recently released version 2.0 offers improved speed—twice as fast as the previous version, according to Adobe.

1. ATM is a cdev (Control Panel Device). To install it, you just drag the main ATM icon and the appropriate driver into the System Folder and restart the Mac (for a Mac Plus, Portable, or SE choose the driver named ~ATM 68000; otherwise choose the driver named ~ATM 68020/030). You can turn ATM on and off from the Control Panel and adjust the size of its font cache—a larger cache makes for faster scaling



but puts memory out of active service.

2. With ATM installed, use Font/DA Mover as you did in the first exercise, but this time install only the 10- and 12-point sizes for each font you wish to place in the System file (remember, for this purpose italic and bold, for example, count as separate fonts).

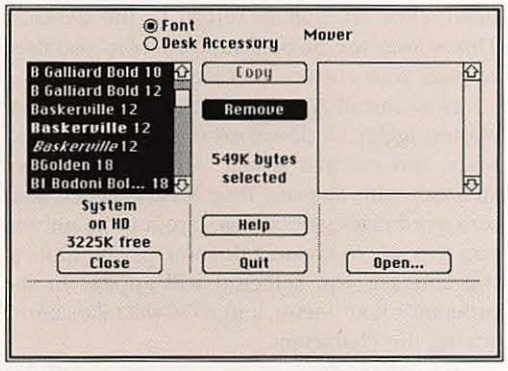
If you're not a big fan of Font/DA Mover, you're in luck. ATM 2.0 includes an INIT called Font Porter that lets you simply drag a suitcase icon into the System Folder to install screen fonts. Restart the Mac, and all the fonts in the suitcase are automatically loaded. Although this method does away with Font/DA Mover, you lose one of the bonuses of ATM—saving disk space by installing a minimal number of screen fonts.

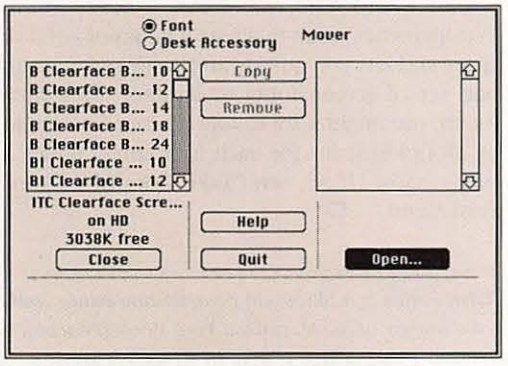
3. For each screen font you installed, drag the associated printer font into the System Folder. ATM gets its scaling information from the printer font, so the printer font must be in the System Folder for ATM to work.

4. With ATM installed, bitmapped fonts will be smoothly scaled to virtually any size, including fractional point sizes if an application supports them. Although characters look blocky at small sizes because of the Mac's 72-dpi screen resolution, even small sizes look good when printed on a QuickDraw or PostScript printer.

Scenario 3: Suitcase II or MasterJuggler

The easiest way to install screen fonts is with a font/DA extender like Fifth Generation Systems' Suitcase II ($79) or ALSoft's MasterJuggler ($89.95). These wonderful utilities let you access dozens of suitcases full of fonts (or desk accessories) without installing them with Font/DA Mover, so you can add or remove fonts without moving them in and out of the System file.





Scenario 4, Step 1 (top): Remove most of the fonts from your System folder. Step 2: Quit Font/DA Mover and copy onto the hard drive the suitcase icons for the fonts you want. Also copy printer fonts into the System Folder. Step 3: Double-click on a suitcase to reopen Font/DA Mover. Hit the Open button (bottom) to create a custom suitcase. ***(continues)***

Suitcase II and MasterJuggler are very similar, so the following instructions can be applied to either utility. Both programs include several companion utilities for viewing fonts, resolving font ID number conflicts, and managing F-keys, DAs, and sounds.

1. Suitcase II and MasterJuggler are INITs, so you simply drag the program's icon into the System Folder, restart the Mac, and the utility is up and running.

2. Copy the screen font suitcases you'll need onto your hard drive. From within Suitcase or MasterJuggler, which are accessed from the Apple menu, you can open the suitcases you want. (The two programs differ somewhat; see your manual for details.)

Font suitcases can be large—from around 200K to more than 600K apiece. Suitcase or MasterJuggler can compress fonts by as much as 50 percent, then automatically decompress a suitcase when you use the fonts from it.

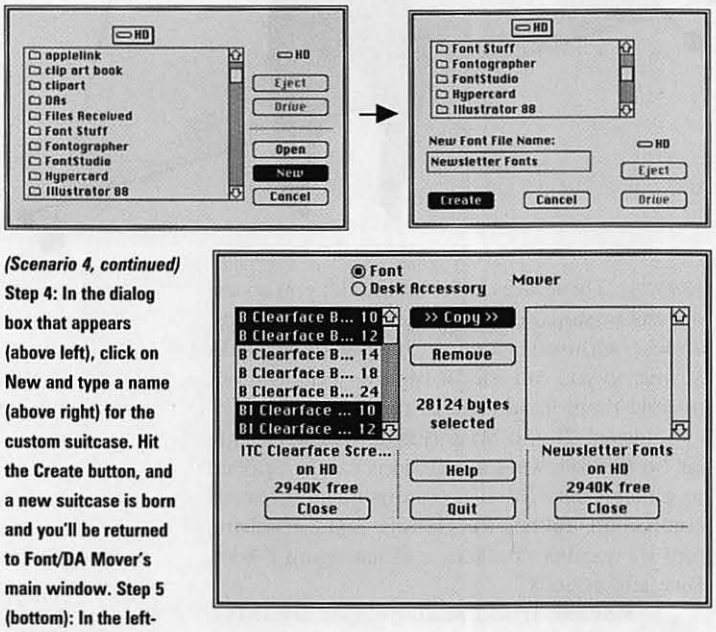
3. If you've finished a project and won't be using a particular suitcase for a while, you can close it in

Suitcase or MasterJuggler and then remove your copy of the suitcase from your hard drive to reclaim disk space.

Scenario 4: The Best of All Worlds

This procedure combines the capabilities of Font/DA Mover, ATM, and Suitcase II or MasterJuggler. Organizing fonts in the following way simplifies adding and removing them, saves disk space by installing the minimum number of fonts possible, and avoids font ID number conflicts.

The first step, which entails removing most of the fonts from your System file, may seem puzzling, but there's a reason for it. You perform this step to prevent font ID number conflicts, those annoying glitches that occur when two fonts share the same ID number. Symptoms of font ID conflicts include installed fonts that fail to show up in a program's Font menu, or a document typed in font *x* that prints in font *y*. Fonts installed in the System file have priority over fonts in a suitcase accessed by Suitcase II or MasterJuggler. If you remove the fonts from the System file, then a font in the System can't elbow its way in front of one in a suitcase.



(Scenario 4, continued) **Step 4: In the dialog box that appears (above left), click on New and type a name (above right) for the custom suitcase. Hit the Create button, and a new suitcase is born and you'll be returned to Font/DA Mover's main window. Step 5 (bottom): In the left-hand column, Shift-click on the 10- and 12-point sizes for each font you want to install. Then click on the Copy button to add the fonts to your new suitcase. Quit to return to the desktop, throw away the original suitcase icons, and install ATM and either Suitcase or MasterJuggler.**

1. Double-click on the Font/DA Mover icon to list the fonts in your System file. Before you proceed, make sure you have the originals of all the fonts you see listed, because you're about to throw away this batch. Select the fonts you want to remove from the System—ideally, you should select all of the fonts listed (note that the Font/DA Mover won't let you throw away Chicago 12, Geneva 9 and 12, and Monaco 9; they're required for System operation).

When you've selected all the fonts you want to delete, click on the Remove button; a dialog box appears asking you "Are you sure you want to remove the selected items?" Click on OK, and the fonts are deleted from the System file.

2. Quit Font/DA Mover. For all the fonts you'll be using, copy the suitcase icons onto the hard drive. To save yourself another round of disk insertions, copy the necessary printer fonts into the System Folder as well.

3. Double-click on one of the suitcases to open Font/DA Mover. The fonts in that suitcase will be listed in the left-hand column. To make a new font suitcase, first click the Open button beneath the right-hand column.

4. In the dialog box that appears, click on the New button.

In the window that appears, type the name you wish to give your custom suitcase. For example, you might want to make a suitcase that holds all the fonts for your monthly newsletter; type **Newsletter Fonts,** and click on the Create button. A new suitcase called Newsletter Fonts is created, and you're returned to the Font/DA Mover's main window.

5. In Font/DA Mover's left-hand column, Shift-click on the 10- and 12-point sizes for each style you want to install. Then, click on the Copy button to add the fonts to your new suitcase. Click on the Close button beneath the left-hand column, and open another suitcase from the list that appears. Install 10- and 12-point versions of each font you wish to add to the newsletter set.

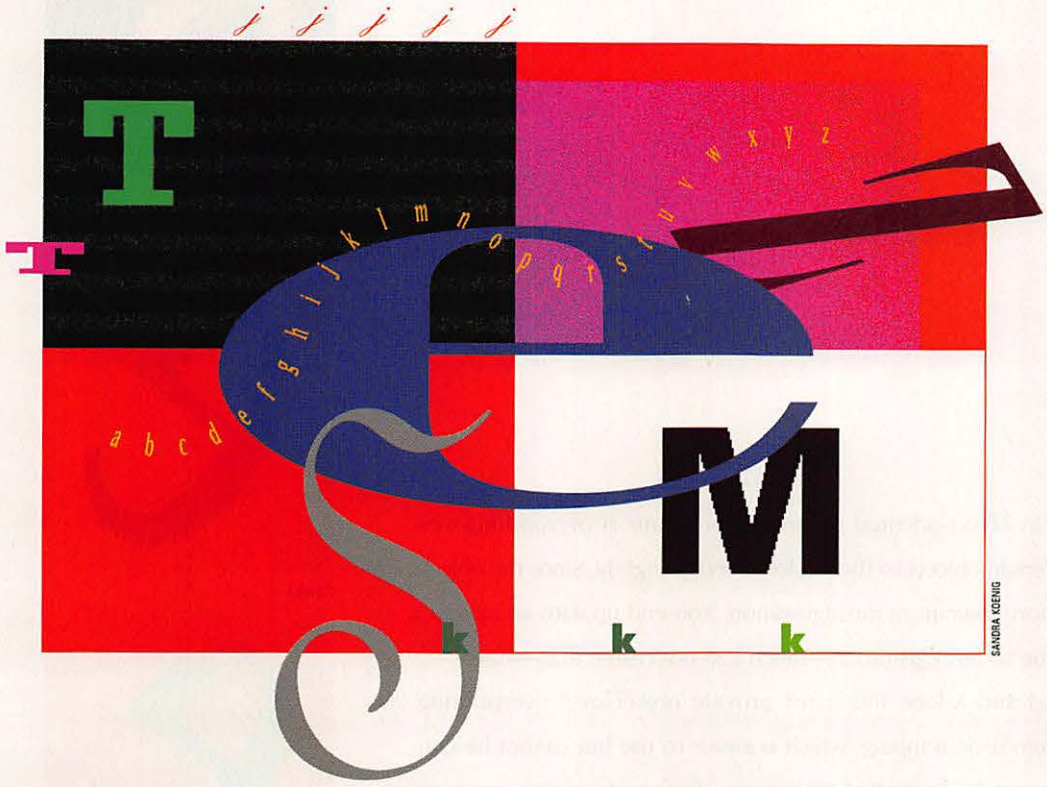
When you've installed all the fonts you need in your Newsletter Fonts suitcase, click on the Close button beneath the right-hand column.

6. When you've created all the suitcases you need, click on Quit to return to the desktop. Throw away the original suitcase icons you used to pack your custom suitcase.

Now install ATM and either Suitcase II or MasterJuggler, as described in the previous sections, and restart the Mac. Open your custom suitcases with Suitcase II or MasterJuggler, start up a word processor or page-layout program, and you're ready to create a document. The fonts in the suitcase you selected will appear in the program's Font menu, and ATM will take care of scaling the characters.

By combining custom suitcases, a font/DA extender, and ATM, you create a flexible font-management system that uses a minimum of disk space and lets you quickly and easily switch from one set of screen fonts to another. As a final touch, you might want to tidy up your font menu by grouping styles for each font family under a single name. If so, see "Take Control of Your Font Menu." M

Erfert Fenton *is a* Macworld *contributing editor and the author of the* Macintosh Font Book *(Peachpit Press, 1989), which is now in its second edition.*



Setting TRAPS

Finding solutions to printing unexpected white gaps between abutting colors

BY STEVE ROTH

You're aghast. You tweaked the colors on the screen until they were just right, and you carefully checked the film and the color proofs. Everything looked just fine. But now the pages are back from the printer and the colors are misregistered by a half-point—a full point on some sheets—and there are blatant white strips where the colors abut. Where did those white strips come from? And how can you avoid them in the future? ▪ The problem is that while Mac programs create absolutely perfect knockouts when one object lies on top of another, printing presses aren't that perfect. Press misregistration is a fact of life, and without some careful attention on your part, so are those fine white lines. ▪ The solution is trapping—a slight overlapping of adjacent colors that compensates for the capriciousness of the press. Color trapping is not a simple operation, but users of the top color programs on the Mac market have tools that address the problem. In this article, I outline some color-trapping techniques that you can use to make your color jobs look clean and professional.

Overprinting

The key to trapping in object-oriented illustration programs is overprinting—extending the outlines of certain objects so their colors overlap slightly. Since the objects overlap, they're much more tolerant of misregistration. You end up with an area in a slightly different color due to misregistration—much less noticeable than white.

Only Aldus FreeHand and Adobe Illustrator provide object-level overprinting. QuarkXPress provides automatic trapping, which is easier to use but cannot be controlled as precisely as manually controlled techniques. Image processing programs such as Adobe Photoshop and Letraset's ColorStudio can't use object-level overprinting to create traps (there are no objects); in these programs you must blend adjacent areas together either manually or automatically.

Choking and Spreading

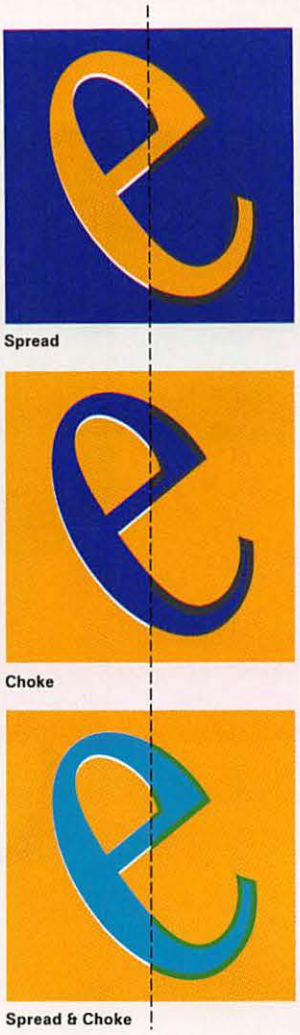
There are two basic types of traps—chokes and spreads. With a choke the surrounding area overlaps an object; with a spread the object expands to overlap the surrounding area. FreeHand's and Illustrator's tools are better for creating spreads, though with a little work you can also get them to do chokes. QuarkXPress and Photoshop create both chokes and spreads. Photoshop and ColorStudio also provide for antialiasing—blending the edges of selections into their surroundings.

Whether you're choking or spreading, you need to decide how big a trap—how wide an area of overlap—to create. This, as with so many color issues, is a decision best made in consultation with your printer. If you produce supermarket ads for your town newspaper, you need bigger traps than you do if you're creating an ad for *Vogue*. Plan on a 1/4-point misregistration with a high-quality sheet-fed press, and as much as a point with a web-fed newsprint press.

There are more sophisticated ways to set traps for specialized needs, but the following pages show the versatility of the basic trapping techniques for desktop publishing. After a little practice with these methods, you will probably never again suffer from misregistration syndrome. ■

See *Where to Buy* for contact information.

Contributing editor ***Steve Roth*** *is co-author of* Real World PageMaker 4: Industrial Strength Techniques *(Bantam, 1990).*



Spread

Choke

Spread & Choke

Object-Oriented Trapping

One way to trap object-oriented elements is to manipulate the *stroke* of the foreground element. A stroke is a line of variable width and color that straddles the outline of an object. Normally, a stroke knocks out the color of the background, providing no trapping effect. For trapping, therefore, use an *overprinting stroke* that overlaps the background color. Designate the width and color of the stroke based on the specific trapping problem.

The left half of each figure has not been stroked, and abutting colors don't register properly (I exaggerated the misregistration and the size of the stroke for clarity). The right half of each figure shows how manipulating the stroke of an element can correct for misregistration. Because strokes in PostScript elements fall halfway outside the line and halfway inside, you usually specify a stroke that's twice as wide as the desired trap. The first figure shows a spread; the yellow of the letter

e overlaps onto the blue background. The second figure illustrates a choke; the yellow background overlaps, printing on top of the blue letter. Normally, make the lighter color encroach onto the darker for the least noticeable effect.

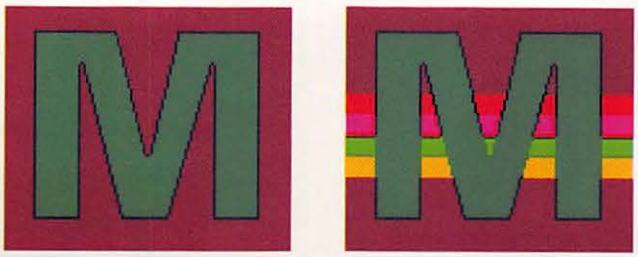
The final figure combines choking and spreading to create a composite color created from the darkest shade of cyan, of magenta, of yellow, and of black found in the background and foreground object. Use this technique to trap objects of similar brightness but of different hues. A composite color straddles the outline of the foreground object, minimizing the distortion that can be caused by a choke (which sometimes makes the foreground object look thinner) or spread (which sometimes makes the foreground object look thicker). This is particularly true with type where stroking can affect the appearance of the letterforms. Unlike a spread or choke, a composite requires a stroke that's exactly the thickness of the trap desired.



Partial Overlaps

When part of an object overlaps a colored background, you may not want to stroke the foreground object all the way around; you may want the trap to appear only where different colors abut (left).

But how do you stroke only part of an object? You can't really, but you can get that result using what is called "clipping" in PostScript; "Mask" in Illustrator; or in FreeHand, "Paste Inside." Just clone the object to be trapped, specify no stroke on the cloned object, then clip it into the area that does not need trapping (right).

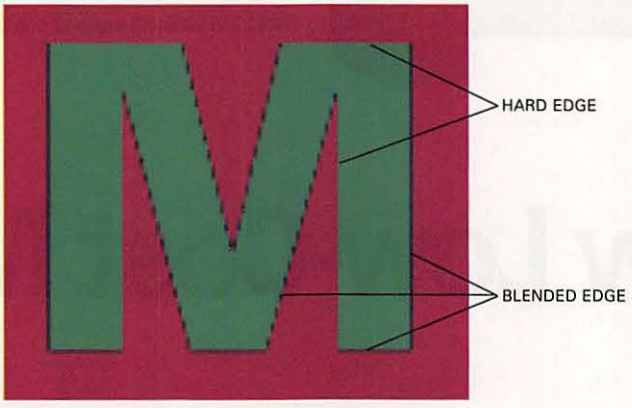


Trapping Color Images in Photoshop

Detailed, multicolor images are among the most difficult to trap, but Photoshop makes it easy. Begin by shifting to CMYK mode; then select Trap from the Image menu, and choose the size of the trap. Photoshop handles the rest automatically. Shift back to RGB mode to see the traps that Photoshop creates (left). Use the Undo command to return to CMYK mode.

In the figure on the right, Photoshop is trapping all adjacent areas of color that are not very close in hue. Note that Photoshop either chokes or spreads, as appropriate.

Although you can combine type, flat tints, and scanned images in Photoshop, and the program will trap all of these, Photoshop is not the ideal environment for laying out type with other graphics. And when you place a Photoshop image in a page-layout program, you still face the problem of trapping that image to adjacent objects, such as type.



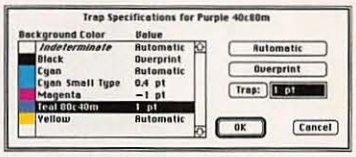
Antialiasing with ColorStudio

Unlike Photoshop, ColorStudio has no explicit trapping command. The trick in ColorStudio is antialiasing, which softens the edges of a bitmapped image into the surrounding colors. But antialiasing doesn't always blend lines that are perfectly vertical or horizontal, making it an imperfect trapping method. Other techniques trap the entire outline of an object. (See *Macworld,* February 1991, "Mac Video, Take II," page 181, for a detailed discussion of antialiasing in Macintosh-generated video production. The general principles in that article apply to all antialiasing.)

To use antialiasing with ColorStudio's Shapes annex, first create the ColorStudio image, and then use the Shapes annex to either create objects or import an encapsulated PostScript (EPS) file. Select Render to Paint Layer from the Operations submenu, and ColorStudio converts the shapes to a bitmap, antialiasing the objects in the process.

Automatic Trapping in QuarkXPress

QuarkXPress traps automatically, based on the colors that are adjacent (for more information on trapping in QuarkXPress, see page 288 of "Insights on QuarkXPress 3.0," *Macworld,* February 1991). You can edit the trapping parameters for any color in relation to any other color. For instance, you can specify that a particular shade of purple always have a 1-point trap when it is next to a certain green.



QuarkXPress implements chokes or spreads for different color combinations; you set positive values to cause spreads, and negative values to cause chokes. You can also specify that any color overprint all other colors (useful, for example, for putting black text on a color background), or leave it all up to the automatic trapping algorithms.

While QuarkXPress's automatic trapping is convenient, it doesn't offer the object-level overprinting control available in Illustrator and FreeHand. For instance, if you have some small serif type and some display type in the same color, QuarkXPress applies the same size trap to each, which could be devastating for the small type. (You can solve that problem by defining two colors with the same CMYK specs but with different names and trapping setups.)

Finally, QuarkXPress doesn't trap scanned images. Therefore, if a scan is surrounded by a red box, is lying on a blue background, or has some color type on top of it, you can expect some white lines where the colors in the scan abut the colors of adjacent objects.

Standard 13" display: 62.7 sq in screen area

Standard 12" display: 48.6 sq in screen area



New Low-Cost Macs

No wonder the Macintosh LC and IIsi are getting the attention of so many design and color publishing professionals. They're tremendous values for the money.

But what happens when you run programs like Quark XPress,™ PageMaker,™ Freehand,™ and Illustrator,™ on standard 12" and 13" displays? You can only work on a *fraction* of the image you'd be seeing on a large-screen display. (A 12" display, for example, has less than 30% of the screen area of a 21" display.)

That's where SuperMac comes in. We've got cost-effective solutions that actually turn low-cost Macs... into large-screen SuperMacs. It's true. And you can see the results for yourself on our 19" and 21" displays shown at the right.

Our low-cost 256-color Spectrum/8™ graphics cards enable the LC and IIsi to run a wide range of displays– more displays, in fact, from more vendors than *any other* 8-bit graphic cards. So you can mix and match cards and displays to get the best results for your needs.

The new Spectrum/8 cards have the same comprehensive array of features as our cards for high-end Macintosh™ computers. That means your applications become large-screen creative tools, delivering one- or two-page spot-color WYSIWYG on the LC or IIsi. Plus impressive results in presentation graphics and gray scale publishing.

You're going for price/performance in color graphics with the LC and IIsi, and *so are we* with our Spectrum/8 cards. Typically, cards like these cost nearly $2,000, but we've priced them at *less than $1,000*. So you can combine a Spectrum/8 card with our 19" SuperMatch™ display and wind up with an *entire* high resolution

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SuperMac 21" display: 168 sq in screen area

SuperMac 19" display: 151.5 sq in screen area



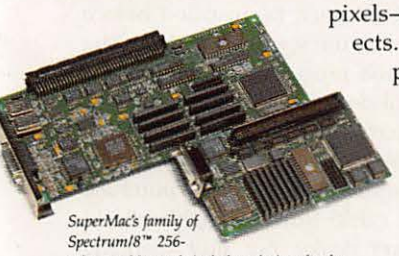
SuperMatch Display Calibrator assures correct color fidelity every time.

New Low-Cost SuperMacs

system for your LC and IIsi–for less than some vendors charge for their displays alone!

Big features for big-screen graphics. Our Spectrum/8 LC and IIsi cards were literally designed for designers. They provide a palette of 256 colors, shades of gray, or any *combination* of colors and grays.

And they give you creative *freedom* with advanced features like these. Virtual Desktop™–of up to 4096 × 1536 pixels–for poster-size projects. Instant hardware pan-and-zoom for close-up views of the graphic details you want to work on. And 75Hz flicker-free resolution to make your work a pleasure for the eyes. It's like we said: our new Spectrum/8 cards will turn your low-cost Macs…into large-screen SuperMacs.



SuperMac's family of Spectrum/8™ 256-color graphics cards includes solutions for the Macintosh LC, IIsi and Macintosh NuBus™ systems (II, IIx, IIcx, IIci and IIfx).

Seeing is believing. Visit your SuperMac dealer now. For a look at our large-screen displays and the Spectrum/8 cards that support them on the LC and IIsi. For the location of your nearest dealer call 1-800-624-8999 (Ext. 210).

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d Freehand a trademark of Aldus Corporation. Illustrator is a registered trademark of Adobe Systems, Inc.

REVIEWS

Color Scanner

ES-300C

Pros: Comparatively inexpensive; performs single-pass 24-bit scanning; Macintosh Interface Kit includes ImageStudio, ColorStudio, and ScanDo DA; can scan via ColorStudio or DA.
Cons: Image area limited to 8½ by 11 inches; only seven brightness levels; no contrast control; DA exaggerates high-intensity colors; SCSI cable not included with Interface Kit.
Company: Epson America. **Requires:** Mac Plus; Mac II with 2MB of RAM for color; 5MB of RAM required to run ColorStudio; SCSI cable. **List price:** $1999; Macintosh Interface Kit $595.



MARK JOHANN

Epson's ES-300C Color Scanner

Color scanners are a luxury, and until an efficient means of image compression is developed and widely accepted, professional-quality color scanning will remain reserved for those few who own monster hard drives and bazillion-megabyte data-storage systems. The fact that a typical 10,000-record database takes up less disk space than a single 8½-by-11-inch, full-color scan makes it hard for most of us to justify producing high-resolution bitmapped graphics on the Mac.

But while image processing technology lags, scanners have recently taken a step forward with Epson's introduction of the ES-300C, the least expensive—with the optional Interface Kit it's $100 less than the closest competitor, Microtek's MSF-300Z—and, I will argue, the best 24-bit scanner available for digitizing letter-size and smaller printed images. For less than $2000, the bargain ES-300C offers the newest flatbed scanning hardware. For $600 more, you get two of the most highly regarded image-editing packages—Letraset's gray-scale ImageStudio and full-color ColorStudio. A little over a year ago, ColorStudio alone retailed for as much as the scanner.

Single-Pass All-Star

Other color scanners, including such favorites as the MSF-300Z and Sharp's JX 450, capture 8 bits of data in each of three passes: one pass each for red, green, and blue. In theory, this arrangement produces a satisfactory 24-bit picture, containing as many as 16 million colors. Unfortunately, reliability varies from device to device. If the three passes are not perfectly synchronized, the red, green, and blue picture components will not register properly, resulting in an image that looks like a badly printed Sunday comics page.

The ES-300C can scan a full-color image in a single pass. This is accomplished by scanning each of the three colors line for line. At line 1, the scan carriage flashes a green light, reads the result, flashes a red light, reads the result, and flashes a blue light and reads that result; the scan carriage then proceeds to line 2. Each line is synchronized exactly because the carriage remains stationary from one color to the next.

This single-pass design is not only more accurate but also faster. A 4-by-5-inch image scanned at 200 dots per inch takes 84 seconds; that's 12 seconds faster than the MSF-300Z takes, and twice as fast as other, more expensive models (see "Color Scanners," *Macworld*, August 1990).

Connect and Capture

The Macintosh Interface Kit for the ES-300C includes a SCSI interface board that must be installed before connecting the scanner to a Mac. The installation process is straightforward and well documented. Unfortunately, the Interface Kit does not include a SCSI cable. An Epson representative told me that you can easily purchase a SCSI cable from a neighborhood computer dealer, but after spending the better part of an afternoon

searching through four computer stores that didn't have any in stock, I'm not sure that is the case. To avoid the hassle, make sure to order a SCSI cable (or a 50/50 cable if you want to daisy-chain) along with the scanner. (On request, Epson will throw in a SCSI cable for $29 extra.)

The ES-300C package includes three programs for capturing and editing images: Letraset's ImageStudio and ColorStudio, and the ScanDo desk accessory from Hammerlab. The last is the most convenient and least demanding method for digitizing scanned images. It uses very little memory and provides access to most of the ES-300C's capabilities. Using the ScanDo DA, you can capture images in black and white, 4-bit and 8-bit gray scale, and 24-bit color. Images can be scaled from 50 percent to 200 percent, and a wide variety of resolution options are provided (though not in 1-dpi increments). This convenience comes at a price, however. ScanDo's color balance controls are limited, geared primarily toward changing an image as little as possible from the raw data read by the scanner. Using the CRT Display B setting recommended for gray-scale and color displays, a scan may appear washed out, lacking sufficient contrast and color saturation. As a side effect, black and other dark areas commonly appear riddled with light green and gray pixels (see "Balance of Color"). This unsatisfactory effect can be remedied using blurring and despeckling filters, such as those available in Adobe Photoshop, but at the expense of detail. (Unexpectedly, a gamma-correction setting recommended for monochrome displays—CRT Display A—provides better color contrast and saturation. Images scanned at this setting require lightening, however.)

You can also capture images using ColorStudio and the ES-300C driver. Though ColorStudio requires 5MB of available RAM to run, it produces much more satisfactory results than the ScanDo DA. The Epson ES-300C Scanner dialog box allows you to adjust resolution and scale by 1 percent increments. You can also rotate an image 90 degrees, enabling you to scan both horizontally and vertically oriented artwork. But best of all, you can use the Exposures scroll bars to adjust the intensity of red, green, and blue light reflected off the scanned page. In addition to giving you greater control over color balance, these scroll bars enable you to increase or decrease brightness. Finally, ColorStudio offers more reliable automatic gamma correction, dramatically improving the transition from printed to electronic media.

As a front end, ColorStudio's only shortcoming is that it allows you to capture only black-and-white and full-color images. It offers no gray-scale options. But because ColorStudio offers a large selection of image-editing features, you can save a full-color scan as an 8-bit or 4-bit gray-scale document.

As this review was written, Epson was in the process of updating both the ScanDo DA and the Epson driver for ColorStudio.





Balance of Color Both versions of this photograph were scanned at 200 dpi. They were cropped using ColorStudio, but are otherwise unaltered. The rough image at the top was produced using the ScanDo DA. The image on the bottom was captured in ColorStudio using version 1.1 of the Epson driver. ColorStudio is less convenient (requiring 5MB of RAM to run), but it produces much more satisfactory color balance and gamma correction.

Best of Its Kind

If you're in the market for a top-quality, inexpensive scanner for capturing full-color photographs and artwork, the Epson ES-300C could be your best bet. It doesn't do slides, and although it can digitize transparencies mounted against a white background, the results are suitable for proofing purposes only. And regrettably, the fact that it can't scan anything larger than 8½ by 11 inches limits its potential for professional users. But if your needs are moderate, the ES-300C is a quick, sturdy, uncomplicated workhorse, capable of inputting 24-bit color scans at a reasonable price.

—Deke McClelland

See **Where to Buy** *for contact information.*



CARLA HALE

Water and Scottish Gold This photo was captured at 300 dpi using ColorStudio, then cropped, sharpened, balanced, and separated using Adobe Photoshop. The result is a splendid picture that rivals those produced using medium-quality traditional separation techniques.

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■ **Library B - "WordProcessing"**
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Sales Letters from Lightning Word: **See Library B.**

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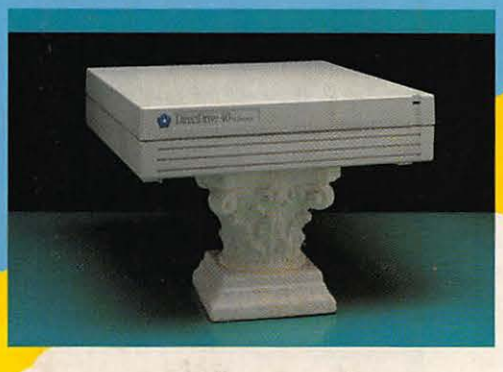


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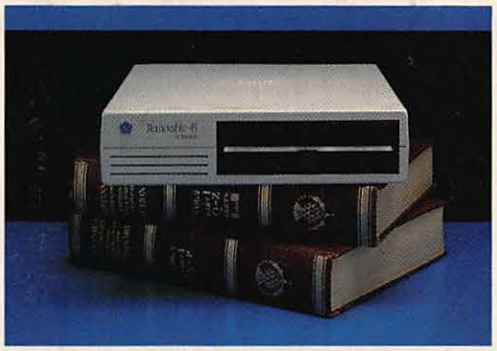
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Circle 126 on reader service card

Encyclopedias

THE NEW GROLIER ELECTRONIC ENCYCLOPEDIA, 1990 EDITION

Pros: Complete text of 21-volume encyclopedia; fast and versatile search function; includes color pictures. **Cons:** No maps or charts; table data can't be copied to Clipboard; not enough pictures. **Company:** Grolier Electronic Publishing. **Requires:** Mac Plus; CD ROM drive with SCSI interface. Recommended: 2MB of RAM. **List price:** $395.

THE RANDOM HOUSE ENCYCLOPEDIA, ELECTRONIC EDITION

Pros: Operates on standard Mac without CD ROM drive; fast and versatile search function. **Cons:** No pictures, maps, drawings, or charts; requires 5025K of space on a hard drive for full functionality; most entries are too brief for serious reference work. **Company:** Microlytics. **Requires:** Mac Plus; hard drive. Recommended: 2MB of RAM. **List price:** $119.

For years we've heard that personal computers would provide an unlimited supply of information at our fingertips—but most of us still use books and periodicals when we need to do any kind of research work. Now software developers are beginning to provide electronic counterparts to our most basic printed scholarly tools, including the standard encyclopedia.

The New Grolier Electronic Encyclopedia

The first available encyclopedia for the Mac was released more than a year ago by Grolier Electronic Publishing. The first Grolier Electronic Encyclopedia packed the complete text from the 21-volume *Academic American Encyclopedia* onto a single CD ROM disc, with room to spare. In addition to updating the text, the 1990 edition uses the leftover disc space to include thousands of color pictures.

The conventional way to use an encyclopedia, of course, is to look up topics alphabetically. If that's your preference, you can use the Browse Title Index option to open a scrollable, alphabetical list of articles. Double-clicking on any title opens that article's window. You can read the article, print it, or copy part or all of it into another Mac document via the Clipboard.

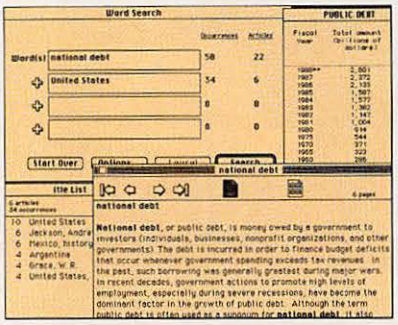
But alphabetical access doesn't take advantage of the CD ROM's random-access capability. You'll find a topic more quickly by simply typing its name into the Word Search window and pressing Return. The encyclopedia software responds almost instantly with a list of every article that contains the word(s) you typed, along with the number of times the typed word or phrase appears in each article. Again double-clicking on an article name opens the article.

The Word Search window also enables you to locate articles that contain a number of different words or phrases. For example, to learn about the national debt of the United States, type **national debt** in the first Word Search box and **United States** in the second. The list that appears shows you which articles contain both of those phrases (see "Searching for Our Debt").

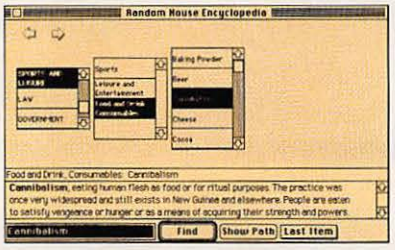
The Grolier software provides many advanced features for searching, so you can quickly locate articles based on just about any criteria. For example, you can request only articles in which the specified phrases are within ten words of each other.

Reading an article may raise new questions. For example, you may want to learn more about the balance-of-payments concept mentioned in an article on the national debt. If you select the phrase and choose Hyperlink to Selection from the Search menu, an article on balance of payments opens in a new window. It's possible to have 16 article windows open simultaneously.

Icons at the top of each article window reveal other views of the subject at hand. An outline option, available for longer articles, lets you look at only the headings, making it easier to locate topics in the article. Some articles have accompanying



Searching for Our Debt The Grolier Encyclopedia's Word Search dialog box enables you to find all articles with user-specified word combinations. The article shown here has a related table.



Narrowing the Search The Random House Encyclopedia's Graphic View enables you to descend through a hierarchy of categories until you reach the desired article.

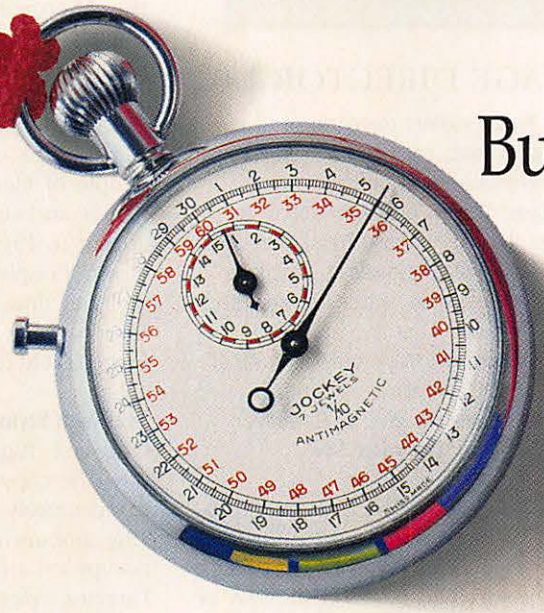
tables that appear when you click on the table icon; other articles reveal four-color pictures when you click on the picture icon. Unfortunately, tables and pictures can't be directly copied to the Clipboard—to create a chart using data from a table, you must retype the data.

The color pictures add a lot to the encyclopedia; many subjects are difficult to comprehend without visual aids. But there are still some major graphics deficiencies in this edition. Notably absent are maps and line drawings, making it difficult to visualize the location of Athens or the difference between Ionic and Doric architecture, for example.

In spite of its shortcomings, the Grolier Electronic Encyclopedia is immediately captivating and ultimately addictive for anyone with a healthy curiosity. The articles are generally well written and thorough (although a few seem strangely out-of-date), the bibliographies provide paths to other sources, and the powerful searching and browsing tools make research seem like a game. If you don't already

(continues)

PostScript solutions for LaserJet printers haven't exactly set records for speed.

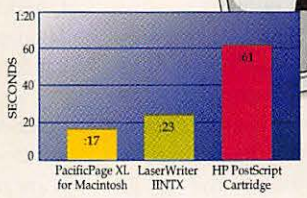


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own a CD ROM drive, Grolier Encyclopedia might be reason enough to buy one.

The Random House Encyclopedia, Electronic Version

If you can't afford a CD ROM drive but need an encyclopedia, consider the Random House Electronic Encyclopedia. This seven-disk package from Microlytics is a text-only version of the popular one-volume *Random House Encyclopedia* and costs about one-fourth as much as the Grolier product. After installation, the complete encyclopedia and retrieval software take a little more than 5MB of space on a hard drive.

You access the Random House Encyclopedia via the same Infodesk desk accessory that's used for Microlytics' other research products, Inside Information and The Elements of Style. This DA enables you to locate, via the Reverse Dictionary, all articles containing a typed word.

The software also includes hierarchical categorization of every topic in the encyclopedia, so you can double-click on ever-narrowing category names until you reach the article of your choice. This organizational scheme is sometimes useful and sometimes entertaining—should Cannibalism be a subcategory of Food and Drink, Consumables (see "Narrowing the Search")? Finally, a Time Line view shows you major events in a category in chronological order.

The necessary brevity of each of the 20,000-plus articles is likely to frustrate anyone who's used to working with a large encyclopedia; one-paragraph articles are the norm, and most leave you needing more information. The Random House Encyclopedia is more like a large, quick-access dictionary than an encyclopedia.

Bits or Pages?

Neither of these products is likely to completely replace traditional paper reference books. Because they lack the drawings, charts, and maps found in their paper counterparts, these electronic encyclopedias can't be thought of as complete reference works. But what they lack in graphics, they make up for in information accessibility. Searching for subjects, browsing through related articles, extracting quotes—these are the kinds of tasks that will seem hopelessly cumbersome with traditional reference books once you've used either of these digital encyclopedias.

—George and Susan Beekman

See **Where to Buy** *for contact information.*

Publication Management Software

PAGE DIRECTOR 1.0

Pros: Excellent management and reporting tools; good color handling; comprehensive, understandable manuals. **Cons:** Doesn't pass Microsoft Word styles through to QuarkXPress; copy-depth measurements somewhat inaccurate; positioning limited to full-point accuracy. **Company:** Managing Editor Software. **Requires:** Macintosh Plus; 1MB of RAM; hard drive; System 6.0. Recommended: 2MB of RAM; Mac IIsi. **List price:** $895.



Even with all the great programs out there for desktop publishing on the Mac, to date we haven't had much in the way of tools for managing and organizing the dozens, hundreds, even thousands of page elements that make up a complex publication like a magazine or newspaper. Managing Editor Software's new program, Page Director, addresses that need admirably.

Using Page Director is a two-step process. First you build a dummy publication using your text and graphics files. Then you use a QuarkXTension to open that Page Director file; the XTension builds the whole QuarkXPress publication for you, based on the dummy you created in Page Director. The XPress publication needs quite a bit of fine tuning, but the bulk of the management, placement, and copy fitting is all done in Page Director before you even get near XPress.

Dummying Pages

You start in the Page Director application by defining page dimensions, margins, number of columns, and gutter width (these measurements, and all others, are limited to full-point accuracy; you can refine these later in QuarkXPress). Then you use the Gather command to read and measure the text and graphic files that will make up the publication. You can even have the program gather elements automatically, by looking in certain folders for files with certain types and creators. If you're building Thursday's sports section, for example, you might tell it to look for all the Microsoft Word files in the Thursday Sports folder on the network hard drive.

Once you've gathered the publication elements you want (yes, you can just go out and get one or a couple of files if you want to), the names and sizes of those elements appear in Page Director's Items list (see "A Couple of Items"). From there you can drag the elements directly onto pages or change their attributes in the Edit Items spreadsheet window.

Text with Style

Of course, Page Director has to know how the copy is formatted in order to accurately measure copy depth (the amount of space the text will occupy on a page). (Note that Page Director styles apply to complete elements, so that within a story you can't style subheads differently from body copy.) Unfortunately—and this is probably Page Director's biggest failing—the program doesn't pass Microsoft Word styles through to QuarkXPress; instead it converts the Microsoft style formatting to hard, local formatting in XPress.

Page Director's hyphenation and justification routines are very different from those in QuarkXPress, so the copy depth as measured by Page Director can be quite different from what ends up in the QuarkXPress publication. This is especially true if you use Page Director's styles rather than the file's native formatting.

You can't see the imported words and pictures in Page Director, or in printouts of the layout; you see only representations of the graphic and text areas. However, you can write headlines, captions, jump lines (such as *continued* and *from page x*), and other short pieces of text such as pull quotes right in the program, and those are readable.

(continues)

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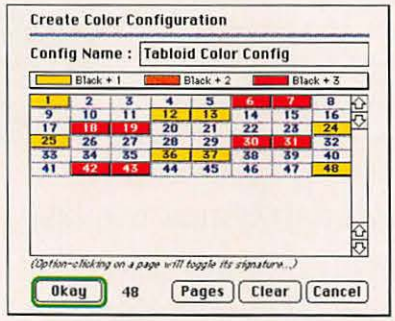
Color Imposition

One of Page Director's more impressive features is the ability to set up color signatures, designating which pages in a 32-page signature will print with the four process colors, for example, or which will have spot color. The program comes with several color configurations common on web presses, but because of the variations in signature imposition, it also provides a Color Configuration Editor that lets you set up your own signature color placements based on what your printer has available (see "The Color of Pages"). You can see the color configuration easily by choosing to show the As Color layout option (see "Show as Color").

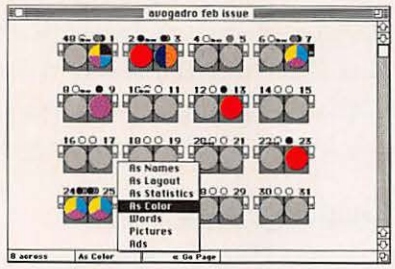
If you try to place a process-color element on a page that isn't set up to print process colors, Page Director asks if you want to change your mind, change the color of the element, or change the color imposition to one that allows color on that page—pretty smart. It's not smart enough to detect spot and process colors within an EPS file, however, so you can place a color EPS on a black-and-white page without Page Director's warning you.



A Couple of Items Page Director's Items List Report provides a fast look at all the elements in a publication—their sizes, types, and attributes. You can use this list to sort and select among the items, and even act on them (place, position, or apply color) without ever looking at the layout.



The Color of Pages Page Director's Color Configuration Editor lets you build color configurations by clicking on a page number and specifying how many colors will print on that page.



Show as Color You can view Page Director's layouts in several ways. The As Color option lets you see at a glance which colors are going to print on various pages in the signature.

Reporting for Duty

In addition to nice on-screen representation of the nascent publication, Page Director provides excellent reports on the status of the publication and its elements. There's a Production Report that lists all the elements on each page with their combined advertising, editorial, and graphic column depths (the amount of column space the graphics will require). The Editorial Report is similar but provides more detail. The Color Report lists the colors available and used on each page. And the Item Files Report lists the source files, their sizes, types, and dates. You can even save a list of items and read it in to a spreadsheet or database, if you currently use one of those systems for tracking elements.

Page Director's manuals—a reference manual and a user's guide—are impressive for their personable writing, almost like one professional talking to another. They do assume some knowledge of publishing (especially newspaper publishing) techniques and terminology, however.

Page Director's inability to import Microsoft styles is a major liability. But even if you never take the final step of building your publication automatically with the Page Director XTension, Page Director is a great management and planning tool. The program lets you look at publications in ways that you never could before—as a list of elements, a set of colors, a batch of ads. Even though it's not currently set up to let multiple users access the same file, it's an impressive solution to a problem that we've been struggling with for years—since the days of clay tablets.—**Steve Roth**

See **Where to Buy** *for contact information.*

Security Software

A.M.E. 1.1

Pros: Can control access to folders and files, serial ports, desk accessories, and disk initialization; maintains comprehensive activities log; can set up user hierarchy and privileges. **Cons:** Can't set limit of failed log-on attempts; conflicts with Timbuktu/Remote; hard drives cannot be reformatted or recovered with normal utilities; does not restrict access to individual printers, only to types of printers. **Company:** Casady & Greene. **Requires:** Mac Plus. **List price:** single user $279; 5-Mac pack $895; 10-Mac pack $1495.



If you've been looking for the software equivalent of a bank vault for your Macintosh, then look no further. Casady & Greene's A.M.E. (Access Managed Environment) promises to protect your Mac from unauthorized use in ways you've probably never thought of. A.M.E.'s security options make it an ideal program for Macs that are used by more than one person, such as a Mac located in a workroom.

Which Level, Please?

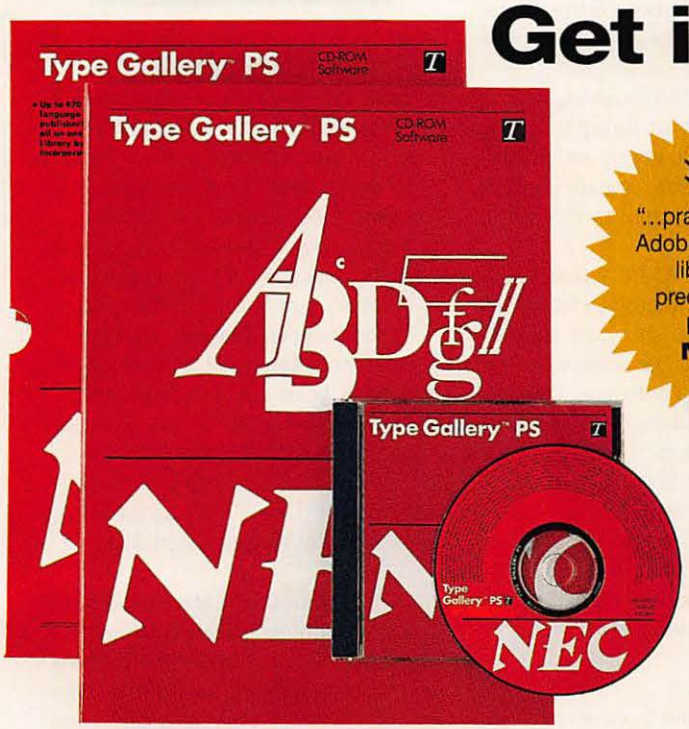
A.M.E.'s security is set up on a tiered structure. At the top is the administrator, who controls everything by setting the security options for other users. Users are assigned a security level below that of the administrator. Those who are assigned a user-management security level, for example, can define access privileges for users at a lower security level.

This security approach could be used for a Mac that is shared by a number of people from different departments. The administrator could give the department heads user-management privileges. The department heads could then set the access privileges of their workers.

Let Me Count the Ways

At the most basic level, A.M.E. requires that each user log on to use the Mac. This requires entering the user's name and a password. The user is also expected to log off when finished. If *(continues)*

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April 1990

Choose the best CD-ROM Adobe type solution–get authentic Adobe® type and a CD-ROM reader for the lowest combined cost from NEC.

Why pay more for Adobe type on CD-ROM? Come to think of it, why pay anything? Choose the CD-ROM Adobe type solution that gives you your **first three typeface families free,** as well as the lowest combined CD-ROM reader/type library cost – and other important advantages.



NEC's unique Intersect CDR-36 CD-ROM reader

Compare NEC's Type Gallery PS to Adobe Type on Call

	TYPE GALLERY PS	ADOBE TYPE ON CALL
• Authentic Adobe type	Yes	Yes
• Initial unlocking	Any 3 volumes, free	Choose 2 of 8 preselected, pay $49-$99
• Future unlocking	Save 48%	Save 30%
• Total typefaces on disc	950	950
• Includes CD-ROM reader	Yes	No
• Documentation	250 page type catalog	User Manual
• Technical support	One source, reader and software	Two separate sources
• Total cost	$499*	Up to $700**

*Manufacturer's suggested retail price based on this special bundle offer available only from selected dealers listed here through June 30, 1991.
**Based on average retail price of Adobe Type on Call and currently available CD-ROM readers.

Now that you know the facts, you'd choose NEC's Type Gallery PS

Wouldn't you? Now you can buy the best Adobe type solution on CD-ROM for only $499! You'll get NEC's Type Gallery PS Locked Version and the unique NEC Intersect CDR-36 CD-ROM reader. You can choose any three typeface families (up to a maximum of 15 individual typefaces) from nearly 1000 Adobe typefaces on the disc. Plus, you'll save an average of 48% vs. Adobe's diskette-based SRP when you call NEC to unlock additional families.

Type Gallery PS from NEC – it's the best way to buy Adobe Type on CD-ROM.

Contact one of the authorized NEC CD-ROM dealers listed here to order your Type Gallery PS/CDR-36 bundle. Or call NEC Technologies at 1-800-NEC-INFO for product literature.

Educorp
1-800-843-9497

Mac Warehouse™
1-800-255-6227

Mac Zone
1-800-258-0882

Tiger Software
1-800-888-4437

Offer valid for purchases made before June 30, 1991 only through dealers listed here.

NEC

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Circle 66 on reader service card

users are accustomed to simply walking away from the Mac after use, the A.M.E. administrator for that Mac can set A.M.E. to log off a user after a specified amount of idle time.

Unauthorized users attempting to guess a password can get increasingly frustrated with A.M.E., hopefully so much so that they give up and walk away. A.M.E. increases the waiting period between log-on attempts by a multiplier that's set by the administrator. Thus the first failed attempt might incur a wait of only 30 seconds, but the fifth or sixth try might mean waiting hours. The only thing I don't like about this approach is that you cannot set a limit to the number of failed attempts.

Once you're logged on, A.M.E.'s security extends to the use of folders, files, desk accessories, printer drivers, the serial ports, inserting and initializing disks, and using and copying applications. For each of these options, the administrator can set different privileges for each user (see "Pick and Choose").

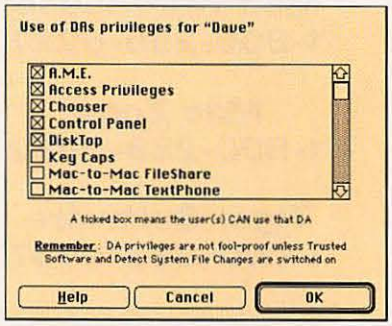
Printer drivers are a different matter. An administrator can select which printer driver, such as for any LaserWriter or AppleTalk ImageWriter, can be used, but cannot restrict access to individual printers.

Big Brother Is Watching

Not only does A.M.E. control access to almost every aspect of a Mac, but it also can log the actions of each user. For example, A.M.E. can monitor individuals logging on and off, and their printer use, DA access, serial port use, disk insertions, program launching, and opening files, among other things. The log can record successful actions and failed ones.

Obviously the activities log will get large quickly if you monitor everything. You can, however, set a maximum size. When the log approaches that limit, A.M.E. removes the oldest entries.

While most of A.M.E.'s interface is straightforward and easy to follow, its use of a picture to show the proportion of the log you've selected to review or delete is confusing. The picture uses two sliders—one to show the first entry selected, the other for the last entry selected. Unfortunately, A.M.E. does not display either a percentage or a file size (in kilobytes or characters) to indicate how much of the log you've selected. I'd like to see this option included.



Pick and Choose This window displays the list of installed DAs (in the System file or using Suitcase II or Font/DA Juggler). Clicking the box before a DA allows a user to use it. Unclicked DAs remain visible to the user, but the user will receive a message from A.M.E. that that particular DA cannot be used.

Program Conflicts

A.M.E. offers so much security it conflicts with some programs and hardware. For example, A.M.E. should not be used with Adobe Separator 2.0, DiskExpress II, INITPicker, Moire, SuperClock 3.7 and 3.8, SuperPaint 1.1, or TOPS 2.0. You cannot use A.M.E. with Bernoulli drives from Iomega.

A.M.E. cannot be used with some disk driver utilities. For example, you cannot update disk driver software while running A.M.E. You must remove A.M.E., update the driver, and then reinstall A.M.E.

A.M.E. and Timbuktu/Remote are not compatible. If you use A.M.E. to assign read privileges to a certain folder, and a Timbuktu/Remote user tries to access that folder, the remote user crashes, and the host (which is running A.M.E.) issues a warning about improper privileges and then hangs up.

Keeping the Lid On

A.M.E. is a comprehensive program for securing access to a shared Mac. The ability to control access to files, serial ports, and printers makes it a strong security program that I recommend, even if some of its fine points need polish.—**Dave Kosiur**

See **Where to Buy** *for contact information.*

Data and Send-Only Fax Modem

DATALINK/MAC

Pros: Easy-to-use cover-page feature; flawless operation as a data modem; on-board speaker; useful fax print options; MNP Class 5 available. **Cons:** Lacks a usable page-preview function; phone book entries listed by contact name only and not alphabetized; relatively high failure rate during fax transmissions. **Company:** Applied Engineering. **Requires:** Mac II with free NuBus board slot. Recommended: Hard drive. **List price:** For data communications only $299; with MNP Class 5 option installed $349; with send-fax and MNP Class 5 $399. Send-fax and MNP Class 5 options each $79.



If you have a Mac II and have been wondering when the NuBus fax modems will finally be available, well, the wait is over. One of the first such units to be released is the DataLink/Mac, a combination 9600-bps send-only fax and 2400-bps data modem. As with other NuBus boards, installation is simple. All you do is slip the board into a free slot and connect it to a telephone wall outlet with the supplied RJ-11 cable. You can also connect a phone to the unit's second jack.

Because many telecommunications programs don't support NuBus serial ports, Applied Engineering provides a combination INIT and cdev that makes the Mac treat the DataLink/Mac as though it were the Mac's internal modem or printer port. The board also contains its own serial port, which will be accessible as a third serial port once Apple's Communication Toolbox software is released.

AE Fax Software

Like other fax modems, the DataLink/Mac comes with software for monitoring fax transmissions, viewing faxes, and maintaining a fax phone book. The cover-page feature is simple, but it does the job of enabling you to create as many different covers as you like.

Fax phone book entries have spaces for a name, a company, and a

(continues)



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As a Macintosh user, you've already made a clear commitment to quality. At MacAvenue, we help you build on that commitment by designing the same high quality into our products and services. From our Protegé drives to our technical support, quality is the first consideration in every hardware and software product we sell.

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MacAvenue gives you toll-free ordering and the best deal anywhere in overnight shipping. When you've decided on a software package or a system enhancement, call our 800 order line (800-926-6221) and you'll get prompt and knowledgeable attention. And for only $2, your order will be shipped to you for next day delivery by Federal Express*.

Top-Notch Tech Support

MacAvenue is committed to providing the best after-the-sale support possible. If you ever have a question about hardware or software purchased from MacAvenue, just call our toll-free technical support line (800-766-6221). If your question is about a particular application, our technicians can almost always bring up the same program on their Macs and have you running smoothly again in a few minutes. If it turns out that we need to replace any of the products we offer, we'll Fed Ex a replacement and pick up the problem item. That means no shipping cost for you.

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We back our products with the best guarantees and warranties in the business. Every hardware product is covered by a 30-day, no-questions-asked, money-back guarantee. Protegé monitors and drives have 1-year (2-year for Quantum drives) limited warranties.

We want to make sure you get what you want at the most competitive price — and that your satisfaction lasts long after delivery! So call us now!!!

* Purchases under $50 will be shipped UPS 2-day, still only $2.

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Key Code 871

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MACAVENUE ANNOUNCES THE END OF THE SCROLL BAR

Constant scrolling takes the creative joy out of graphic design — not to mention driving you crazy. And waiting for the screen to refresh can chase off the most ardent Muse. MacAvenue rescues you from the creative doldrums with a larger and sharper image of your whole design. No scrolling.

Our Protegé Display systems are value leaders in large-format Macintosh displays. Sharp screen images, flicker-free refresh rates and convenient ergonomic features such as a tilt/swivel base mean Protegé Displays are comparable to Apple and Radius products that can cost twice as much.



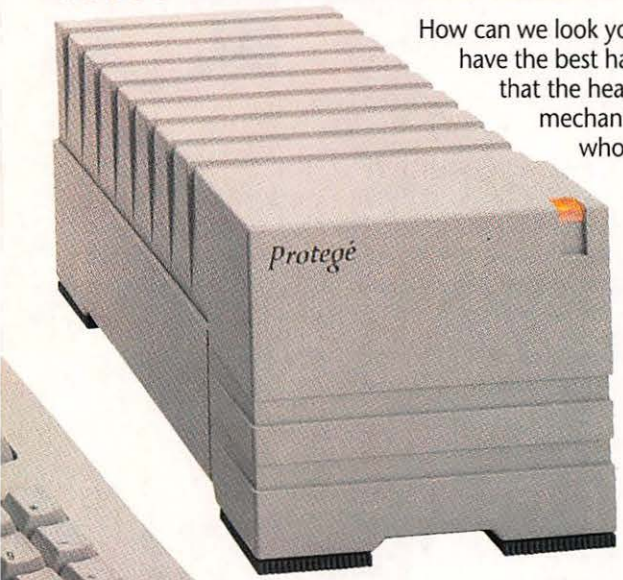
Berkeley Systems™ After Dark and Now Software's™ Now Utilities — FREE!

A $169.00 Value!

The 15-inch, ultra-high resolution screen of the Protegé Full-page Display features a complete 8 1/2" x 11" page with no reduction of image size or quality. Complete with video card, it's only $495. Or get a 2-page view with the 20" Protegé Dual-page Display for a mere $895. Just to make sure you get full enjoyment from your Protegé Display, we bundle Now Utilities and the After Dark screen saver — ***FREE!***

For a second opinion, ask **Bob LeVitus**, author of *Dr. Macintosh*, who says, "I love the crisp, bright image I get with a Protegé Display. And with the 30-day, no-questions-asked money-back guarantee, you just can't go wrong. I highly recommend the Protegé Display." Sure, other companies offer large monitors. But MacAvenue's prices let you actually take one home.

PROTEGÉ — THE BEST HARD DRIVE IN THE BUSINESS



How can we look you straight in the face and tell you we have the best hard drive on the market? Everyone knows that the heart of any hard drive system is the drive mechanism — and it's usually the same, no matter whose name is on the product.



All Protegé hard drives come pre-loaded with OnLocation, the amazing file-finding utility. And as a special bonus with Quantum drives, you'll also receive Now Utilities from Now Software.

A $259.00 Value



So what makes the Protegé drive different?

It's not just another pretty case. The Protegé's metal interior and plastic exterior — just like the Mac's — allows us to control air flow and buffer the drive noise. When you work with the Protegé, all you hear is the sound of one hand clapping! Our DiskMaster™ management software lets you set up password-protected partitions that are easily accessible via the Control Panel. ProDOS and A/UX are also supported. But don't take our word for it. Ask **Robert Wiggins**, *MacUser's* longtime business columnist, who gives the Protegé drive his "highest recommendation." Or **Steven Bobker**, contributing editor to *MacUser* and *Computer Shopper* who says the Protegé is "far and away the best value on the market."

Protegé Hard Drives

Capacity	External		Internal	
	Seagate	Quantum	Seagate	Quantum
20+MB	$345	n/a	$295	n/a
40+MB	$395	n/a	$325	n/a
50+MB	n/a	$479	n/a	$349
80+MB	$525	n/a	$465	n/a
100+MB	n/a	$669	n/a	$539
200+MB	n/a	$979	n/a	$899

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NEW MacAvenue Software Paks!



More Fun, Less Money

The new **MacAvenue Fun Pak II** gives you 5 great games: Solitaire Royale, Talking Moose, Dark Castle, Apache Strike and Shanghai. More than $200 worth of software for $49.95!

Fun Pak II. 29410.....**$49.95**

Make Life Better

The **MacAvenue Better Living Pak** gives you Dinner at Eight (including The Encore Edition and The Weeknight Gourmet), QuickLetter, Synchronicity and Protector Shark. Six packages worth more than $300!

Better Living Pak. 29402.....**$49.95**



TIME AND PROJECT SCHEDULING

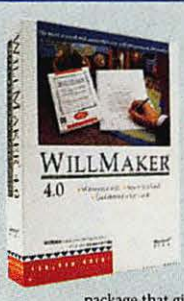
Claris

Claris MacProject II v1.21	29740	$366

Communications

ON THE MODEM

CompuServe		
Macintosh Membership Kit v1.0	30576	$23
Farallon Computing		
White Knight	27664	$89
Microcom		
Carbon Copy Mac v1.04	27708	$119
Microsoft		
MS Mail Workstation	27676	$83
Prodigy Services		
Prodigy Startup Kit	27726	$27
Solutions Inc.		
Faxgate Plus	27712	$237
Technology Works		
GraceLan v1.0	27750	$375



Save the Attorney's Fees

Write your will with the help of **WillMaker** 4.0, the software package that gives you plain English instructions for writing a legally binding document. This program even explains complicated options for leaving property to minors. (All states but Louisiana).

WillMaker 4.0 (Nolo Press). 29888.....$37

Tops		
Tops Network Bundle/DOS	27685	$164
Tops Network Bundle/Mac	27682	$188
Traveling SW		
LapLink Connectivity v3.2	27711	$99

ON THE NETWORK

Dataviz		
MacLink Plus v4.5	27718	$128
Farallon Computing		
Timbuktu v3.1	27667	$95
Insignia Solutions		
Soft PC AT EGA Add-on Module	27716	$125
Soft PC v1.3	27714	$245

Education and Entertainment

ON THE LEARNING CURVE

Broderbund Software		
Calculus v1.2	27964	$58
Geometry v1.2	27962	$58
Physics v1.2	27966	$58
Type! v1.0	27958	$18
Davidson & Assoc.		
AlgeBlaster Plus	28042	$37
Math Blaster Mystery	27970	$29
Math Blaster! v1.0	27968	$29
Electronic Arts		
Mavis Beacon Teaches Typing	28056	$32
Goldstein & Blair		
Mac Bible, 3rd edition	28026	$24
Mac Bible (Super)	28028	$35
Great Wave		
KidsMath v1.1	27990	$26
KidsTime v1.1	27988	$26
NumberMaze v1.1	27992	$26
Individual SW		
Training for Pagemaker	28030	$38
MECC		
Exploring Microsoft Works	28032	$18
Number Munchers	28034	$29
Word Munchers	28036	$29
Sensible Software		
Sensible Grammar v1.6.2	28010	$51
Simon & Schuster		
Typing Tutor	28008	$28
Visionary Software		
Synchronicity v2.5	28040	$48

JUST FOR THE FUN OF IT

Accolade		
Mean 18	28690	$27
Ishido	28776	$32
Stratego	28772	$31
Activision		
Cosmic Osmo	28700	$43
Manhole	28696	$29
Manhole (CD ROM)	28698	$36
Addison - Wesley		
Stupid Mac Tricks	28750	$19
Broderbund Software		
Playroom	28770	$32
SimCity Supreme (Mac II)	28680	$47
SimCity v1.2	28678	$29
SimEarth	28764	$45
Carmen San Diego Europe	28674	$29
Carmen San Diego USA	28676	$29
Carmen San Diego World	28672	$29
Carmen San Diego Time	28774	$29
Bullseye		
Fokker Tri-plane v2.02	28682	$25
Casady and Greene		
Mission Starlight	28752	$29
Sky Shadow	28754	$29
Centron		
Casino Master	28758	$48
Casino Master Deluxe	28760	$58
Electronic Arts		
Bards Tale	28654	$32
Chuck Yeager Flight Simulator	28656	$32
Earl Weaver Baseball	28768	$32
Pipe Dream	28740	$17
In-Line Design		
Bomber v2.0	28739	$32
Darwin's Dilemma	27840	$30
Tesserae	27838	$30
Sierra-On Line		
Kings Quest 1	28724	$29
Kings Quest 2	28726	$29
Kings Quest 3	28728	$29
Software Toolworks		
Chessmaster 2100	28748	$32
Life & Death	28658	$32
Spectrum Holobyte		
Faces	28766	$24
Falcon v2.2	28614	$30
Tetris	28606	$22
Welltris	28604	$25
XOR		
MacGolf	28708	$35
MacGolf Classic	28628	$52
MacSki v1.0	28756	$39
NFL Challenge v1.2	28630	$57



More Than Fun

Now there's another mesmerizing Mac game — **Tesserae** from Inline Design. A fast-moving board game that challenges you to remove all but one piece, **Tesserae** is addictive fun in either color or monochrome. A variety of layout shapes and 3 levels of play.

Tesserae (Inline Design). 27838.....$30



Create Professional Animation

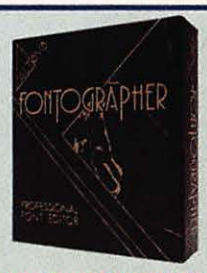
FilmMaker from Paracomp gives you professional-quality animation with features such as real-time control over position, scale and rotation of animated objects, as well as full-screen anti-aliasing. And with the help of **FilmMaker**, your presentations also will take on new power.

FilmMaker (Paracomp). 29900.....$437

The Graphic Arts

MOSTLY DRAWING/PAINTING

Adobe		
Illustrator v3.0	29789	$348
Photoshop v1.0.7	29266	$498



More Creativity with Type

Create truly unique typefaces with the help of **Fontographer** 3.1. You can scan in type or start from scratch; Fontographer offers an auto-trace feature and tools to draw your own. Also lets you edit bitmaps for screen fonts.

Fontographer 3.1 (Altsys). 29910.....$249

Aldus		
FreeHand v3.0	29785	$389
Personal Press	29916	$204
Baseline		
Color MacCHEESE v1.05	29310	$57
Claris		
Claris CAD v2.0	29207	$639
Claris MacDraw Professional	29205	$289
Claris MacPaint v2.0	29202	$92
Generic Software		
Generic CADD	29280	$372
Paracomp		
Swivel 3D Professional v1.0	29294	$437

GRAPHIC ART COLLECTIONS

Multi-Ad Services		
ProArt Holidays	29876	$95
ProArt Sports	29878	$95
Paracomp		
Swivel Art v1.0	29308	$82

MOSTLY GRAPHICS EDITING

Paracomp		
FilmMaker	29900	$437

PRESENTATION MANAGERS

Symantec		
More v3.0	30605	$265

CERTIFICATE AND AWARD GENERATORS

Broderbund Software		
Print Shop v1.3.1	29836	$35

GRAPHICS UTILITIES

Frame Technology		
FrameMaker Mac	29864	$819

DO IT YOURSELF PROGRAMMING

MicroSoft		
QuickBasic v1.0	27590	$64
Spinnaker		
PLUS v2.0	27826	$285
Symantec		
Just Enough Pascal v1.0	27582	$48
THINK C v4.0	27586	$165
THINK Pascal v3.0	27584	$166

OPTICAL CHARACTER RECOGNITION

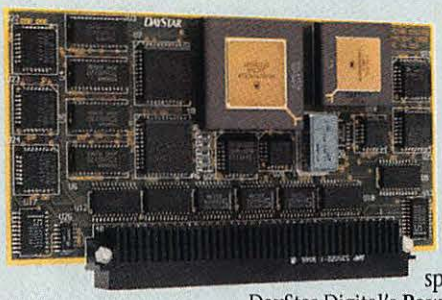
Dest		
Recognize!	30640	$479

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DayStar Gives You Top Speed

When you're ready for serious high-end performance — up to 50 MHz speed — you need DayStar Digital's **PowerCache IIci.** Plug in this turbo-charged cache card and your IIci will be the fastest Mac alive, faster than even the IIfx.

PowerCache 40 MHz IIci with co-processor (DayStar). 23651.....$1167
PowerCache 50 MHz IIci with co-processor (DayStar). 23649.....$1993

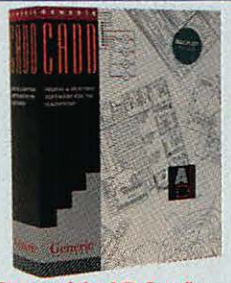
See listings for other DayStar PowerCache cards.

KEYBOARDS, MICE, ETC.

Advanced Gravis		
ADB Mousestick	25286	$66
DataDesk		
Mac 101 Keyboard Platnm (Plus)	25185	$134
Mac-101 Keyboard, ADB	25180	$134
Mac-101 Keyboard Beige (Plus)	25181	$134
SWITCHBALL	25183	$98
SWITCHBOARD	25182	$159
Kensington		
Turbo Mouse ADB	25281	$107
Turbo Mouse Plus	25280	$107
MacAvenue		
101 Extended Keyboard ADB	25186	$99
MicroSpeed		
MacTrac (SE, II, IIgs)	25285	$75
Mouse Systems		
Little Mouse	25283	$75
Trackball ADB	25284	$69
Seiko		
DT3600 Digitizing Tablet	23734	$295

ACCESSORIES

American Power		
UPS 110SE	26292	$207
UPS 370ci	26294	$329
Applied Engineering		
QuadraLink	26917	$205
Bernouilli		
Bernouilli B33C 44MB Tape Cartridge	57804	$95
Calcomp		
WIZ	26918	$157
Cover-Up		
Diskette Wallet 10pk (alligator)	26909	$7.50
Diskette Wallet 10pk (blue)	26910	$7.50
Diskette Wallet 3pk (alligator)	26911	$5.50
Diskette Wallet 3pk (blue)	26912	$5.50
Mac Plus KB Skin (81 Key)	25780	$14.95
Mac Plus KB Skin (w/ # Pad)	25781	$14.95
Mac SE/II 101 KB Skin	25782	$14.95
Mac Plus/SE Dust Cover	26894	$8
Fellowes		
Compact Personal Shredder PS 50	52655	$119
Inland		
3 Mode Surge Protector	40505	$14.50
InnovativeTechnology		
The Library (grey)	26903	$14
The Library (black)	26905	$14
Interex		
9 Pin Male to 9 Pin Male	26298	$7.95
Keyboard Replacement Cable, 3ft	26900	$7
Mac 128/512 to Hayes DB9 to 25pin, 6ft	26281	$8
Mac 128/512 to Imgwrtr DB9 to 25pin	26282	$8
Mac to SCSI 25pin M to 50pin M 2ft	26280	$13
Mac to SCSI System Cable, 6ft	26290	$17
MacPlus Peripheral Adapter cable, 1ft	26283	$8
MacPlus, SE, II to Apple Modem	26284	$8
MacPlus, SE, II to Hayes DIN8 to 25pin	26285	$8
MacPlus,SE,II to Imgwrtr DIN8 to 25pin	26286	$8
MacPlus,SE,II to Imgwrtr II DIN8 to DIN8	26287	$8
Mini DIN-8 to Mini DIN-8 Null	26297	$7.95
SCSI Terminator, 50pin M/F Daisy-Chain	26295	$18
SCSI Terminator, 50pin male	26296	$18
Irwin Magnetics		
External Tape Back-Up 5040/60	23832	$529
External Tape Back-Up 5080/120	23833	$719
Kensington		
Apple RGB Anti-Glare Filter	26891	$64
Mac II Monitor Extended Kit	26899	$32
Mac II Monitor Stand	25580	$64
Mac II Stand and Cable Kit	26892	$64



"Cream of the 2-D Crop"- Infoworld

Generic CADD from Generic Software gives you powerful computer-aided design features and sophisticated tools — all the tricks of the trade — at a price that's only a fraction of other CAD package prices.

Generic CADD (Generic SW). 29280....$372

Kensington *(continued)*		
Mac II System Stand	26887	$24
Masterpiece Mac II	26893	$103
SE Anti-Glare Filter (beige)	26882	$32
SE Anti-Glare Filter (platinum)	26883	$32
Security Kit	26884	$33
System Saver Plus (beige)	26888	$64
System Saver Plus (platinum)	26907	$64
System Saver SE	26889	$63
Tilt/Swivel Monitor Stand	25582	$24
Universal Printer Stand	26896	$17
MacAvenue		
Fuji Rainbow Diskettes-1.44M DS/HD	47496	$15.95
Keyboard drawer	41753	$19
Teak 3.5 Double Rolltop Box (90)	41601	$29
Teak 3.5 Single Diskette Box (45)	41600	$17.99
Teak Keyboard Drawer	41752	$69
Pace		
MacAvenue Carrying Case	26898	$65
MacAvenue Carrying Case Extended Kybd	26901	$76
Sony		
3.5 Diskettes 1.44MB 10Pk	57440	$24.95
Sony 3.5 Diskettes 800KB 10Pk	57401	$13.95
Sophisticated Circuits		
PowerKey	25030	$64
Tripplite		
SpikeBar SK6-6	40510	$22

SOUND INTERFACES

Articulate Systems		
Voice Navigator II	23736	$649
Farallon Computing		
Hyperdialer	26886	$32
MacRecorder	23730	$158
Passport Designs		
MIDI Interface	23732	$76

Writing and Publishing

WORD PROCESSING, WRITING

Ashton-Tate		
FullWrite Professional v1.5	30601	$215
Claris		
Claris MacWrite II v1.1	30586	$142
Microsoft		
Microsoft Word v4.0	30582	$245
Microsoft Write v1.0	30584	$83
Nolo Press		
WillMaker v4.0	29888	$37
WordPerfect		
WordPerfect Mac v2.0	30591	$298

PAGE LAYOUT PUBLISHING

Aldus		
PageMaker v4.0	29781	$497
Claris		
Claris SmartForm Designer	29200	$289
Ventura		
Ventura Publisher v3.0	29906	$582

UTILITIES FOR WRITERS/PUBLISHERS

DeltaPoint		
Taste	30638	$86
Lexpertise		
MacProof v3.2.3	30631	$115
Lifetree		
Correct Grammar v2.0	30633	$49
Reference Software		
Grammatik Mac v2.0	30634	$50

FONTS AND FONT UTILITIES

Adobe		
Adobe Plus Pack v1.0	29834	$119
Streamline v2.0	29269	$124
TypeAlign v1.0.4	29826	$59
TypeManager v2.0	29825	$57
Broderbund Software		
Typestyler	30450	$115

More Serial Ports



Expand your system's expandability. Applied Engineering's easy-to-install **QuadraLink** lets you add four additional serial ports to your Macintosh. Includes a "shadow driver" so that all the new ports will be recognized by virtually all software.

QuadraLink (Applied Engineering). 26917$205

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INTEGRATED/BUNDLED APPLICATIONS

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Microsoft Works v2.0 w/ Quicken v1.5	30580	$199

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Turbo Tax	28500	$51
DAC		
Easy Light Checkbook Acctounting v2.0	28475	$41
Intuit		
Quicken v1.5	28458	$39
Meca		
Managing your Money v4.0	28467	$142
Reality Software		
WealthBuilder v1.0	28496	$145
Softsync		
Accountant Inc. Professional v2.0	28480	$345
SoftView		
if x: Personal Tax Analyst	28498	$47
MacInTax 1040 Federal 1990	28502	$59
Software Toolworks		
Dollars & Sense v5.0	28465	$86
Timeslips		
Timeslips III v2.0	28504	$196

DATA ANALYSIS AND PRESENTATION

Odesta		
Data Desk v3.0	27818	$458

DATABASE

Acius		
4th Dimension v2.1	27780	$485
File Force	27820	$247
Claris		
Claris FileMaker Pro	27789	$216
I.B.S.		
DataClub v1.1	27748	$199



HP Printing Utility

MacPrint lets you print from any Mac application to the Hewlett-Packard LaserJet and DeskJet series printers as well as the Epson EPL 6000. Convenient Chooser-level driver selection provides straight forward Mac printing.

MacPrint v1.2 (Insight). 30428$94

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FoxBase + Mac v2.1	27791	$292
Microsoft		
Microsoft File v2.0A	27798	$123
MySoftware		
MyAdvanced MailList v2.0	27817	$29
Preferred Pubs		
Database v1.5	27834	$67
Sensible Software		
Bookends v1.2	27830	$51

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Microsoft		
Microsoft Mail v2.0	30496	$85
Power Up		
Letter Writer Plus v1.0	30440	$54

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Wingz v1.1	30184	$253
Microsoft		
Microsoft Excel v2.2	30180	$245

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NEW! TI microLaser XL (35-font). 22859..$3095

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5MB LPS External Protegé	24399	$669
0MB External Protegé	24400	$979
MB LPS Internal - (IIcx,ci)	24194	$349
5MB LPS Internal - (IIcx,ci)	24195	$539
0MB Internal - (IIcx,ci)	24196	$899
MB LPS Internal - (SE-IIx)	24198	$349
5MB LPS Internal - (SE-IIx)	24199	$539
0MB Internal - (SE-IIx)	24200	$899

ate

MB External Protegé	24380	$345
MB External Protegé	24381	$395
MB External Protegé	24382	$525
MB Internal - (IIcx,ci)	24184	$295
MB Internal - (IIcx,ci)	24185	$325
MB Internal - (IIcx,ci)	24186	$465
MB Internal - (SE-IIx)	24180	$295
MB Internal - (SE-IIx)	24181	$325
MB Internal - (SE-IIx)	24182	$465

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tegé HD Carrying Case	26908	$24



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facAvenue's Protegé modems are eliable, easy to operate and priced to nove! Each modem is shipped with uickLink II software.

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rotegé 2400 external. 22315$139
rotegé V.42bis. 22317$219

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800K Floppy Drive	24735	$205
h-Density 3.5 1.44K Floppy Drive	24736	$239

na Communications

naFile 1.2MB DF0200	24732	$550
naFile 360K DF0100	24738	$519
naFile 360K/1.2MB DF0102	24733	$725
naFile 360K/1.44MB DF0104	24737	$745

su

K Floppy Drive	24731	$99

ega

noulli 40-40	24384	$2195
c 1B Interface Kit	23834	$48
table 44MB	24385	$1429

nect Technology

K 5.25 Drive	24740	$299
ve 2.4 (3.5)	24730	$328

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Postscript for LJ-II	38432	$299

Complete PC

Complete Page Scanner	22753	$758

Dest

Personal Scan w/ Recognize! Software	22762	$699

Digital Vision

Computer Eyes B/W	22758	$198
Computer Eyes Color	22759	$348

Dove

DoveFax-External	22701	$297

Epson

ES-300C Color Scanner w/ I/F	22765	$1824

Kodak

M150 Mac Portable	22855	$519

Logitech

ScanMan 32	22751	$319

MicroTek-IMSI

Microtek 300Z Color Scanner	22755	$1945

Orchid

OrchidFAX Modem	22702	$457

Relisys

Tefax RA2110	22700	$895

Seiko

Label Printer	22852	$184
Labels for Seiko Label Printer	35623	$11.99

Seikosha

Personal Printer SL20000AP	22857	$235

Texas Instruments

17 Font microLaser w/ ATalk board	22856	$1429
17 Font microLaser XL w/ ATalk board	22858	$2795
35 Font microLaser w/ ATalk board	22851	$1749
35 Font microLaser XL w/ ATalk board	22859	$3095
Envelope Feeder	23056	$279
Legal Paper Tray	23057	$59
microLaser Toner Cartidge	38311	$46

COMMUNICATIONS-MODEM

Applied Engineering

DataLink Express w/ MNP-5/Send Fax	22312	$239
DataLink/Mac w/ MNP-5/Send Fax options	22313	$275

Global Village

Teleport Modem	22311	$134
Teleport Fax 9600	22314	$195

Hayes

Smartmodem 9600	49578	$899

MacAvenue

2400 External w/o SW	49557	$119

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MacCon+ IIE thk/thn	22538	$375
MacCon+ IIET thk/UTP	22529	$375
MacCon+ SE30E thk/thn	22526	$375
MacCon+ SE30ET thk/UTP	22531	$375
MacCon+ SEE thk/thn	22525	$295
MacCon+ SEET thk/UTP	22532	$295

Dayna Communications

EtherPrint	22541	$355

Farallon Computing

Liason v3.0	27744	$259
PhoneNET Connector DB-9	22511	$31
PhoneNET Connector Din-8	22513	$31
PhoneNET Repeater	22517	$313
PhoneNET StarController	22516	$824
Portable Pack	22519	$329

Interex

Localtalk connector DB-9 to Din 3	22520	$32
Localtalk connector Din-8 to Din 3	22521	$32
Phone Connector DB-9	22522	$25
Phone Connector Din-8 w/ cable	22523	$25

Nuvotech

Nuvolink II	22536	$275
Nuvolink SC	22535	$389

Shiva

NetModem V.32 9600 baud	22528	$1425
NetSerial X232	22504	$275

Technology Works

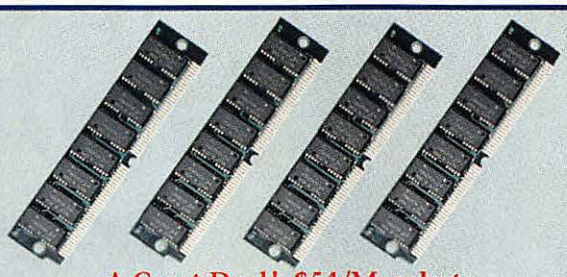
Mac II Ethernet Kit	22539	$275
Mac II/10t Ethernet Kit	22540	$275



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MacAvenue

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Protegé Dual Page Display w/ SE Card	22015	$895
Protegé Dual Page Display w/ SE/30 Card	22016	$895
Protegé Full Page Display w/ Mac II Card	22013	$495
Protegé Full Page Display w/ SE Card	22011	$495
Protegé Full Page Display w/ SE/30 Card	22012	$495

Micron

Mac II 8-Bit 1024X768	23544	$585
Mac II 8-Bit 640X480	23543	$345
SE/30 8-Bit 1024X768	23542	$585
SE/30 8-Bit 640X480	23541	$345

RasterOps

RasterOps 24STV	23658	$1549
RasterOps 8S	23536	$459
RasterOps 245	23537	$759
RasterOps 264/SE30	23539	$685



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The compact (3" x 5 1/2" x 1 1/2") **Teleport Modem** is the first full-featured modem that connects to your Macintosh via Apple Desktop Bus. The **Teleport Fax** unit offers send/fax capability at 9600 bps.

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Teleport Fax 9600. 22314$195

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Grey Scale 19" monitor GS for Mac II	22007	$1614

Seiko

14" Color RGB	22002	$595
20" Color w/ 8-Bit 1024X768 Mac II	22018	$2770
20" Color w/ 8-Bit 1024X768 SE/30	22019	$2770
20" Trinitron Color Monitor w/o card	22009	$2395

Sigma Designs

Colormax 19" monitor w/ Mac II adapter	22000	$4645
L-View Multi-Mode 19" w/ Mac II adapter	22008	$1495
PageView 15" w/ Mac II adapter	22100	$1050
PageView 15" w/ SE adapter	22101	$999
PageView 15" w/ SE/30 adapter	22106	$1050
SilverView 21" w/ Mac II adapter	22104	$1599
SilverView 21" w/ SE adapter	22107	$1599
SilverView 21" w/ SE/30 adapter	22103	$1599

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030 33MHz IIcx w/ co 68882	23641	$1899
030 40MHz IIcx w/ co 68882	23642	$1999
030 50MHz IIcx w/ co 68882	23643	$2599
50MHz PowerCache IIci w/coprocessor	23649	$1993
50MHz PowerCache IIci w/o coprocessor	23650	$1687
40MHz PowerCache IIci w/coprocessor	23651	$1167
40MHz PowerCache IIci w/o coprocessor	23652	$947

Technology Works

IIci Cache Card w/64K	23648	$269

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Applied Engineering

1MB Upgrade for MacRam Portable Card	25488	$359
MacRam Portable Card w/ 1MB	25487	$499

MacAvenue

1MB TI Laser Memory Upgrade	25489	$159

Interex

Tool kit; 3 pieces	26881	$15

Technology Works

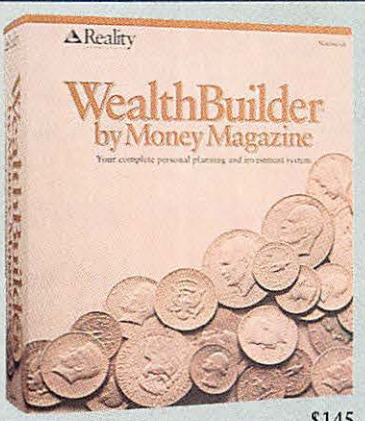
2 X 1MB SIMM Kit 80ns	25480	$108
4 X 1MB SIMM Kit 80ns	25482	$216
4 X 4MB II/IIx SIMM Kit	25490	$1195
4 X 4MB IIfx SIMM Kit	25491	$1399
4 X 4MB SIMM Kit 80ns	25481	$1120
Mac Portable 1MB Upgrade Kit	25485	$389
Mac Portable 3MB Upgrade Kit	25486	$1195
2 X 4MB Module for Mac IIsi, LC, IIci	25492	$560
3MB Module for Mac Classic	25495	$215

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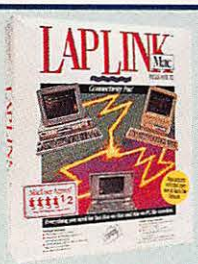
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WealthBuilder v1.0 by *Money* magazine (Reality Software). 28496 $145



New Connectivity Solution

LapLink Mac has always been a great way to transfer files between Macs or between Macs and PCs. Now, **LapLink Mac III Connectivity Pac** includes a unique universal cable and improved software to make transfers even easier.

LapLink Mac III Connectivity Pac 3.2 (Traveling Software). 27711 $93

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APB Express v1.0	30544	$55
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Mac Tools Deluxe v1.01	30365	$79
Microcom		
911 Utilities v1.0	30550	$89
Complete Undelete v1.0	30420	$49
Salient		
Disk Doubler v3.0	30546	$47
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Norton Utilities for the Mac v1.1	30436	$84
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Deskworks	30524	$228

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After Dark v2.0	30425	$24
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Pyro v4.0	30399	$25
Ibis Software		
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Virex	30413	$59
Symantec		
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Disktop v4.0	30354	$63
QuicKeys v2.0	30357	$94
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Freedom of Press Light v3.0	30554	$58
Freedom of Press v3.0	30444	$255
Fifth Generation		
Suitcase II v1.2.3	30402	$49
GDT		
ParaLink Express	30548	$99
Insight Development		
MacPrint v1.2	30428	$94
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Now Utilities v2.0	30498	$75
Power Up		
Calendar Creator v1.0	30432	$41
Letter Writer Plus/Address Book Plus v1.0	29404	$85

CD-ROM Software

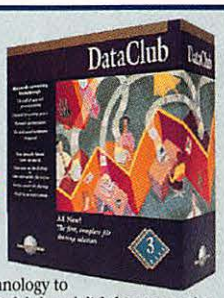
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US Civics	28012	$79
World Factbook 1989	28014	$79

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department. Using a cover page and this information, you can easily perform group transmissions of a single document (see "Designing a Cover Page"). Fax addresses that you use frequently can be assigned ⌘-key equivalents so that you can select them with a single keystroke. However, the phone book has two shortcomings. First, the phone book lists an individual's name, but not the company name. If you deal with a lot of people, you might find it difficult to send a fax to a particular company if you can't remember the name of the contact person. To be really useful, the phone list should display both the contact name and the company. Second, you cannot sort entries in the phone list. New entries are simply appended to the end of the list. If your phone book contains many entries, you can have trouble even finding the person you want to fax.

The DataLink's AE Fax software contains an Out Box, which serves two purposes. It shows the status of all faxes (received, error, busy, queued, and so on) and it serves as a record of sent faxes. Unfortunately, as long as a fax is listed in the Out Box—whether sent or not—an image of it is stored on disk in the System Folder. To save disk space, you must remove the files from the Out Box, which reclaims the disk space but also eliminates the record of these faxes having been sent.

The View option for examining faxes is wholly inadequate. Each fax page is shown as a 1-inch-square thumbnail—much too tiny to read or check for accuracy. It is useful only for seeing if all pages made it into the fax file and if the document sent appears to be the one you intended.



Designing a Cover Page Using any paint or draw program, you design your cover page as a graphic or PICT object. Next, you convert it to a fax image by printing with the Chooser device AE Send-Fax selected. Within the AE Fax program, you then finish creating the cover by pasting the graphic from the fax file into a cover-page file. Finally, you can pick and position fields to be automatically filled in each time you send a fax, including the name, company, department, and phone number of the sender and recipient, as well as the date and total number of pages in the fax.

Sending Faxes

To send faxes, you just select the Chooser device AE Send-Fax and issue a Print command from any of your favorite programs. All print jobs are then translated into fax format and sent out through the fax modem. You can also schedule them for transmission at a later time, as long as it's within the next 24 hours. In addition, a variety of Page Setup and Print options are provided. Faxes can be either letter or legal size; and either standard (100 dpi) or high-quality (200 dpi) resolution; they can be sent with or without a cover page and headers, and pages with blank space at the end can automatically be trimmed, saving transmission time. Using the Hold feature, you can send multiple documents to a location in a single transmission.

Recipients of the test faxes that I sent all reported that the quality was very good. As with other fax software, though, interword spacing when using styles such as italics suffers in standard-quality faxes. Since Apple's LQ fonts are not provided, you will have to purchase them separately or use Adobe Type Manager if you want high-quality output.

DataLink/Mac's transmission times are similar to those for other fax modems. For example, it took 4 minutes and 21 seconds to send a high-quality 3-page fax from Microsoft Word. Sending a 3-page PageMaker 4.0 document to a 4800-bps fax modem took about 6 minutes. Transmitting files is a background operation, but converting files to fax format occurs in the foreground, tying up the Macintosh, and complex documents can occasionally take a long time to convert. The 3-page PageMaker file, for example, took 4 minutes. Microsoft Word documents, however, converted quickly.

Fax Problems

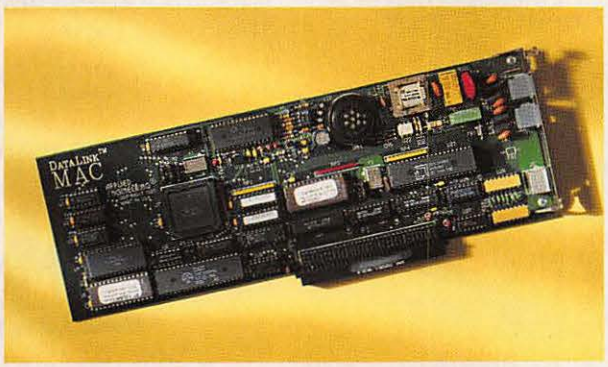
I experienced a number of serious problems while using the DataLink/Mac, including several system crashes and applications that unexpectedly quit during the conversion process. Removing my normal INITs failed to correct these problems. Two crashes even trashed parts of the fax software, which then needed to be reinstalled. In my tests, I was able to send faxes without problems only about 60 percent of the time. All files eventually reached their destinations but many took two tries.

The DataLink/Mac's performance as a Hayes-compatible data modem is flawless, and the availability of MNP Class 5 data compression is a plus. As a fax modem, however, DataLink/Mac's only significant selling point is that it's a NuBus board, so it doesn't take up desk space or require a separate power supply. In the same price range, however, you can currently buy an external fax modem with the same feature list—plus "receive" capabilities and more robust software. Before the DataLink/Mac can be recommended, the software needs further work and more features, and receive capability should be added to the board.

—Steven Schwartz

See **Where to Buy** *for contact information.*

DataLink/Mac from Applied Engineering.



MARK JOHANN



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INTOUCH

Pros: Unlimited records; instantaneous searches; multiple layouts for printing envelopes and labels; prints bar codes, facing identification marks (FIMs), and message lines; exports in many file formats; phone-dialing macros.
Cons: No sort capabilities; cumbersome importing procedure; lacks on-screen help; no hot-key pop-up option.
Company: Advanced Software.
Requires: Mac 512KE. **List price:** $69.95.



As a writer, I need to keep in close contact with many people. To help, I've always used a phone-dialing desk accessory, several databases of client addresses, and a couple of envelope-printing utilities. Unfortunately, they're all separate programs. Now I can handle all those functions with a single DA.

Database Features

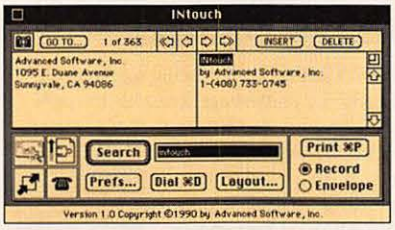
The Intouch screen is divided into two windows (see "Intouch's Main Window"). The left window is for addresses, and the right is for notes and phone numbers. The note window for each record can contain 32,000 characters—the equivalent of about 14 document pages. You can scroll both windows. The note window has its own zoom box that expands to 3 by 5 inches.

Each window is treated as a separate field. In the address window, you can enter information in any order, but you must use a carriage return to end each line. Whatever you enter in the address window is exactly what will print when you generate a label or an envelope. You should note, however, that the U.S. Postal Service frowns on addresses that do not end with zip codes—finishing with an "ATTN: Mr. Jones" is a no-no.

A lightning-fast, case-insensitive search option lets you quickly find any record in the database. If you just want to browse through the file, you can have a hard time finding a particular record. You cannot sort the database in this version of the program. Cutting and pasting with Intouch's insert function to position new records helps overcome this limitation somewhat, but it's definitely the hard way. Since searches examine both the address and note windows, you might want to add keywords in the note window to help you identify common addresses; for example, use *Mac* to indicate a Macintosh software or hardware vendor. In addition to the Search button, you can use the arrow icons to move to the next, previous, first, or last record. There's also a Go To button that can take you directly to any record number.

If you already have a database of names and addresses that you'd like to use, Intouch can import two file types: QuickDex and tab-delimited text files. Most databases and spreadsheets can create tab-delimited files, so it is relatively easy to move files into Intouch. Then, however, the fun begins—Intouch has no way of knowing where an address ends and the phone number and optional notes start. To finish importing, you must manually split the two pieces apart for each address. Since my address file had more than 350 entries, this meant that I spent the next few hours fixing the file. According to Intouch's product manager, the next version might provide an option to search for and automatically split each record after the zip code. Intouch can export 18 popular file formats, plus ASCII text.

A snapshot button (the tiny camera icon in the main window) enables you to easily move information between Intouch and other programs via the Clipboard. You can move addresses into Intouch by copying them to the Clipboard and then pressing the Option key while clicking on the snapshot button. Of course, normal Macintosh editing keys and commands are also supported.



Intouch's Main Window Option screens, accessed by clicking on the icons in the lower left corner of the screen, enable you to preview envelopes, pop up the Page Layout dialog box, import or export data, and set dialing options. The Layout button lets you create new envelope and label styles, return-address definitions (with graphics), and message lines.

Number, Please

If you have a modem, Intouch can dial phone numbers found in the note window. By default, the program dials the first number listed, but you can dial another number by positioning the cursor in front of it. If you don't have a modem, you can dial through the Mac's speaker, placing your phone's mouthpiece near it. According to the company this works best with earlier Macs (a 512KE, a Plus, or an SE).

Other options let you specify a prefix to dial (for example, 1, 9, or a calling-card prefix), a string to end each dialing action (*;b* can be used, for example, to hang up the modem), and your local area code. You can also create macros and assign them to ⌘-1, ⌘-2, or ⌘-3.

Printing

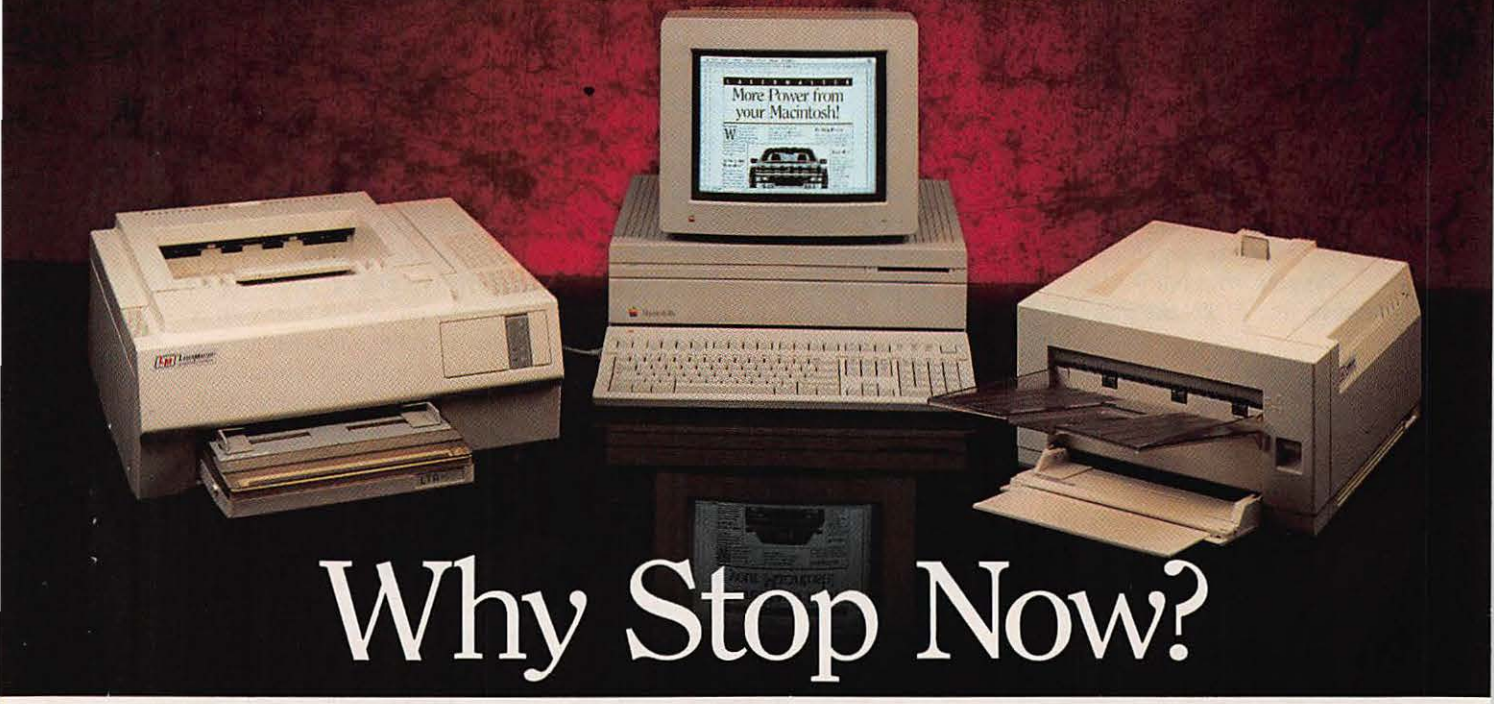
You can create and save up to 15 styles for envelopes and labels—specifying the print area; text font, style, and alignment; paper-feed option; and whether or not to include a bar code. For envelopes, you can also choose any style of return address (with text or graphics), specify a font, and select a message to print at the bottom. You can also use Intouch to print self-addressed envelopes, and envelopes without the mailing or return address. Records can be printed with the address information, notes, or both. Supported printers include the Image-Writer, all LaserWriters, and the HP DeskWriter.

Intouch quickly became one of my most frequently used DAs. The next release should make the product even more flexible and easier to use. According to the company, new features will include the ability to perform HyperCard-style sorts on any word in any line of the address field, support for multiple-address files, improved importing, network compatibility, and more custom options. The new version will be sent free to registered users. Either way, you will like this program.—**Steven Schwartz**

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LASERMASTER

Banner-Printing Program

BANNERMANIA

Pros: Wide variety of banner types and design elements; produces high-quality color banners in minutes; uses Adobe Type 1 fonts as well as specialized fonts; can randomly cycle through banner patterns; easy and fun to use. **Cons:** Unimaginative selection of premade banners; no clip-art graphics included; no ability to import graphics; limited to two text lines. **Company:** Brøderbund Software. **Requires:** Mac Plus. Recommended: second disk drive. **List price:** $59.95.

If you're the kind of person who likes to announce things—birthdays, parties, your niece's graduation, the opening of your tenth store—then you should take a look at BannerMania, a superb product from Brøderbund that lets you produce banners of virtually any length, style, and color.

BannerMania has many advantages going for it: it's simple to use; it has a selection of customized fonts; it automatically sizes text; and it gives you the ability to customize a banner's color, size, patterns, and shape.

BannerMania enables you to make inventive banners and posters in a matter of minutes. Once you've typed in a 1- or 2-line message, you can change the basic banner components using five pull-down menus: Layout, Fonts, Effect, Color, and Shape. BannerMania offers a palette of 20 special effects, ranging from three-dimensional lettering to balloon backgrounds, and 27 banner shapes. By selecting the Paisley Up pattern from the Shape menu, and the Vibes effect from the Effects menu, I was able to make a pretty good approximation of a 1960s-era rock-and-roll concert announcement. One of the best features of the program lets you instantly change a message's shape—from an arch to a teardrop, from a ribbon to a wave—to see the effect the new shape has on your banner.

Ready to Go

For those of you who want truly instant gratification, BannerMania also includes a selection of more than 50 ready-made color and black-and-white banners. You can choose a ready-made banner and then substitute your own message for the prewritten one. I found the selection of premade banners, however, to be rather uninspired—the standard collection of "Happy Birthday!" messages you'd find on balloons.

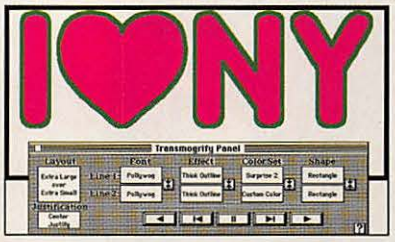
In fact, if there's a flaw in the design of BannerMania, it's in the conservative nature of the fonts and graphics. Most of the 19 included fonts are takeoffs on circa 1950s type styles, so many of the posters end up looking like Woolworth's advertisements or Barnum & Bailey circus posters. You can, however, import any typeface found in Adobe Systems' Type 1 font library into your banner.

BannerMania is essentially a text-based program. It includes a few graphic elements such as pointing fingers, hearts, and cowboy boots, but they are too plain for most uses. The ability to import graphic elements into the banners would improve the program greatly.

Easy to Use, Easy to Color

Ease of use is one of BannerMania's biggest pluses. Besides its intuitive menu selections and on-screen help features, the program comes with a well-written and concise manual. The manual guides you through every step of creating a banner.

To get the most from BannerMania you need access to a color monitor and a color printer. You can choose from BannerMania's 68 colors or choose one of the program's 152 preassigned color sets. You can still produce color files in gray scale, but it is much harder to design a color banner working only with color codes. BannerMania is ideal for producing high-quality gray-scale banners.



Spontaneous Generation on an Apple Even if you're no Michelangelo when it comes to design, with BannerMania you can create inventive banners quickly. Type a message and click on Transmogrify to cycle randomly through different colors, shapes, special effects, fonts, and sizes. You can stop the process when you see something you like, or lock individual features as they cycle by.

The banner's size is limited only by the printer's paper-handling ability. Your banner can be as small as one page or long enough to fit across your front window. You can stretch or compress text to fit on a specific number of pages. You can either change length without affecting height and vice versa, or you can reduce or enlarge both dimensions, keeping the same ratio by using a scale control.

If you use a laser printer, banners can be longer than one page but will have gaps where the edge of the paper is carried by the printer mechanism. It's even easier to use a printer with continuous feed or the ability to use special banner-size paper.

Teaching Transmogrification 101

BannerMania's Transmogrify command enables you to randomly cycle

(continues)



Quick Concert Announcements Special effects such as paisley shapes and vibrant fonts make it easy to create something like this 1960s-style poster. BannerMania has its own collection of fonts, but it's also possible to import Adobe Type 1 fonts into a banner. You create virtually all elements of a banner using an extensive set of pull-down menu commands.



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through various patterns, shapes, and colors while keeping the message of the poster intact. ("Calvin and Hobbes" fans might remember how Calvin is constantly using his Transmogrifier to change himself into a dinosaur or an insect.)

When you transmogrify a banner, the text remains the same, but every other characteristic—shape, colors, and so on—changes automatically. Brøderbund has put quite a bit of effort into the Transmogrify feature; you can freeze and lock specific components of a banner as it cycles by, so that you retain individual layouts or shapes while the other components keep cycling.

You can also use Transmogrify as a screen saver. Just enter a message into BannerMania and set the program on Transmogrify to get an endless cycle of color banners relaying your message to anyone who stops by your computer.

No matter what your artistic ability, BannerMania enables you to generate truly elegant banners in a fraction of the time it would take with a typical illustration program. All in all, I heartily recommend BannerMania to anyone who needs to spread a message in a big way.—**Michael Dashe**

See **Where to Buy** *for contact information.*

Organization Chart Software

ORG PLUS FOR MACINTOSH 1.0

Pros: Customizable features; can resize charts to fit page. **Cons:** Options can be confusing; can't create tables or reports; supports only PICT graphics format. **Company:** Banner Blue. **Requires:** Mac Plus; second disk drive. **List price:** $195.



No matter how large a corporation you're dealing with, Org Plus helps you visualize the corporate hierarchy. Now available on the Macintosh, this program has been available since 1986 for computers running MS-DOS. Org Plus enables you to make organization charts with thousands of boxes, establishing connecting lines and relationships automatically.

Plenty of Bells and Whistles

You might think that creating an organization chart is no great problem. Just draw a box in a program like MacDraw II, duplicate the box a few times, drag the duplicated boxes into position, enter text, and add connecting lines. Simple, huh?

Even when the chart has only a few entries, it's not as easy as you might think. For a large chart, the logistics involved in getting it right with a drawing program can be mind-boggling. Org Plus provides the bells and whistles for handling any size group, makes adjustments automatically, and indicates almost any relationship between boxes.

The program begins by asking you what information you want in each box (up to 24 lines' worth): name followed by title, title followed by name, or a custom arrangement. (You can temporarily hide any sensitive data; for example, you might include salaries only on the chairman's copy of the chart.)

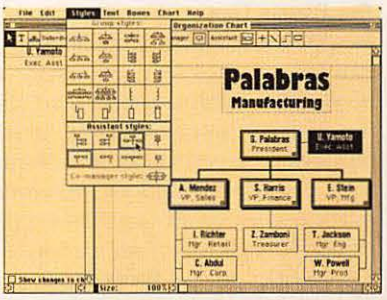
A box now appears at the top of the chart, in the format you've specified. You can add subordinate boxes to the side on the same level, side by side underneath, in a single column underneath, and so on (see "Editing a Chart"). You can select various line widths, appearance options, border styles, and any typeface installed on your System. You can even use a different font for each item in a box.

As you enter data, the box you're working on expands or contracts to display the text properly—no manual juggling required. You can either enter text directly into the boxes or speed up the process by using an edit panel to make the entries in bulk (the edit panel is shown at the left side of the "Editing a Chart" screen). Org Plus also helps you rearrange and resize the entire chart to save space.

In fact, there are so many features, that the excellent manual contains over 250 pages.

Special Features

Text and drawing tools are provided for annotating charts. These annotations appear as a separate layer superimposed on the chart. Because they are handled independently when you shrink or enlarge a chart, the annotations are not affected.



Editing a Chart The resizable edit panel occupies the left side of this screen. A pull-down menu shows choices for placing boxes and lines to indicate relationships.

You can import graphics, such as a company logo, through the Clipboard, but in PICT format only; after you import images, you can resize them and drag them to new positions.

You can import the text from a database or word processing program, but only if the text is in tab-delimited ASCII format. Nevertheless, this capability can save many hours in creating a chart for a large organization. If the name of an employee's manager is included in a database, the program even maintains the reporting relationship.

You can cut and paste boxes between charts, separate large charts into several smaller ones, and merge several small charts into a single large one. You customize defaults such as the spacing between boxes. You can also save a series of chart formats to maintain a consistent appearance throughout the departments of a company.

The Downside

Org Plus is so chock-full of features that it is hard to remember whether you access a particular function by pressing ⌘, Shift, or Option. Although most features adhere to the standard Mac interface, the program is not intuitive; you must read the manual and learn specific procedures.

You can't create automatic headers or footers for multipage charts, and there is no support for color. You can't create oval boxes, you can't shade boxes, nor can you place a background in them. And although the IBM version lets you create tables and reports, the Mac version doesn't.

(continues)

The Bottom Line

Despite these few shortcomings, Org Plus is a must-buy for companies that need to constantly create, update, and distribute organization charts. It has no direct competition on the Macintosh. Small organizations, however, might not use all of Org Plus's capabilities enough to warrant paying the $195 asking price.—**Marvin Bryan**

See **Where to Buy** *for contact information.*

Exercise/Ergonomics DA

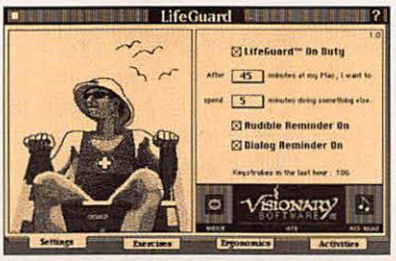
LIFEGUARD

Pros: Real help for repetitive strain injury; simple, elegant design and easy setup; highly user-configurable; useful ergonomics information. **Cons:** Some INIT conflicts. **Company:** Visionary Software. **Requires:** Mac Plus; System 6.0.2. **List price:** $39.95.



I've been waiting for a product like LifeGuard to come along. One of the first personal-computer programs—and apparently the first and only for the Mac—to take notice of the repetitive strain injury (RSI) and eye fatigue that are associated with long hours at the computer, this ingenious desk accessory politely interrupts you (at intervals you determine) and prompts you to take a break. The prompt can be a sound, a flashing menu-bar icon, and/or a dialog box that says it's time to stop working for a few minutes and do something else.

If you work at the Mac nonstop for hours, you risk RSI, which can be extremely painful and ultimately disabling. RSI comes in various forms; a common one is carpal tunnel syndrome, which affects the wrists and hands. In most cases RSI can be prevented or alleviated by taking fairly frequent, short breaks and doing simple exercises. But even if you know this, even if you've experienced the pain of RSI yourself, it's hard to remember to stop when you really get into what you're doing—which is why LifeGuard's reminders are such a help. Besides the user-configurable prompts, the program provides easily accessible, clear drawings and descriptions of gentle but effective exercises in seven groups: Whole Body, Eye, Neck, Shoulder, Back, Wrist, and Hand. LifeGuard also has diagrams and information on workstation ergonomics; the excellent manual offers more ergonomics information plus a bibliography.



LifeGuard on Duty Choose LifeGuard from the Apple menu, and the main settings window appears. The tabs at the bottom take you to the sections on exercises and ergonomics and to the activities window, where you tell LifeGuard what you want to be reminded to do on your break.

Settings, Snoozes, and Sounds

One of LifeGuard's virtues is that the main window, accessible from the Apple menu, is where you set the timing of interruptions and the duration of breaks. There's no clicking through a series of dialog boxes to change the settings. Another plus is that LifeGuard is smart—unlike an alarm-clock application, it doesn't just go off automatically at a certain time. If you take a break, LifeGuard knows—because it monitors keystrokes and mouse movements—and adjusts its timing accordingly, resetting itself when you start work again. So if you already take regular breaks from work, you may never hear from LifeGuard at all.

LifeGuard's snooze function—which works like the snooze bar on a clock radio—and sound function are accessible via icons in the main window. You pick the length of the snooze and set up any key combination to get a brief respite from LifeGuard's nagging.

As for the audible prompts, several of the sounds provided are charming, and a few are smarmy. I am not a fan of talking agents: when my computer intones "Relax" in the deep, smooth voice of a hypnotist, it is risking defenestration. I could do without the blissful Sigh, too, and the heartfelt digitized "I love you." But you can discard the sounds you don't like and still have plenty of choices left. Morning Flute, African, and Ticka-Ticka are my favorites; I experimented on my three office cube neighbors with these sounds turned down fairly low, and two of them never heard them at all (the third noticed Ticka-Ticka and said she liked it). You can record new sounds with a digitizer such as Farallon's MacRecorder or directly on one of the new Macs, such as the LC, that come with a sound-input microphone.

LifeGuard is easy to install and has good context-sensitive help and expert tech support (in case you have a lot of other INITs loaded and encounter an INIT conflict, as I did—I used an INIT-management utility to fix the problem). LifeGuard is a straightforward program that fulfills its purpose admirably. It takes some of the drudgery, and potentially a lot of the pain, out of computer work.

—**Felicity O'Meara**

See **Where to Buy** *for contact information.*

Editor's Online Reference

EDITORIAL ADVISOR 1.0

Pros: Comprehensive; simple to use; customizable word lists and style sheets; clearly written. **Cons:** Some information too elementary, some too skimpy; navigational routes sometimes indirect. **Company:** Petroglyph. **Requires:** Mac Plus; hard drive; System 6.0.5. Recommended: 2MB of RAM if operating under MultiFinder. **List price:** $149.95.



Editorial Advisor, a comprehensive online reference guide for editors and writers, will appeal most, I expect, to copy editors (a select breed, we like to think ourselves), who have a special curatorial responsibility for the grammatical correctness and stylistic consistency of the books and articles with which we work. It is a straightforward and useful package—free of diverting bells, whistles, or entertaining graphics. Its authors' goal was to assemble as

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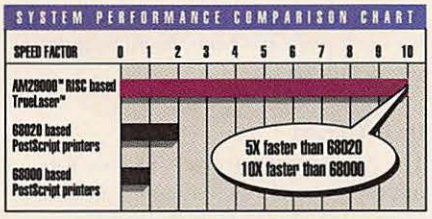
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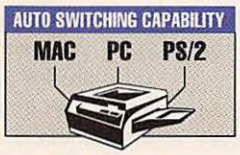
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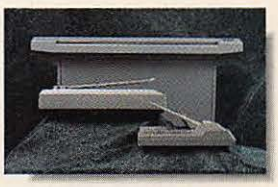


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complete a source on grammar, punctuation, usage, editorial conventions, and so on, as is possible in a relatively small amount of digital space (the program occupies a little under 2.5MB); and using HyperCard's system of buttons and links, to make all that information easily accessible.

Editorial Advisor actually comprises six HyperCard stacks, but because of the way they are linked, navigation among them is transparent. Although some familiarity with HyperCard is helpful to understanding the program's organization, it's not necessary; both the manual and the online help stack do an adequate job of explaining the hierarchy in the familiar terms of a genealogy.

All cards show the same row of 18 small icons running along the top. These include buttons for accessing help, performing a search, appending a note, entering items in the house style guide and word list, and placing and locating bookmarks, as well as moving around in the family tree. Directional arrows lead upward (to more general categories) and left or right (to related topics at a parallel, or sibling, level). One button takes you to the main Contents card, another to the subject index, yet another to the word index. There's also an Options button for which you can designate your chosen function, and one that leads backward through as many as 50 previously viewed cards. If you prefer pulldown menus to buttons for finding your way, they're available too.

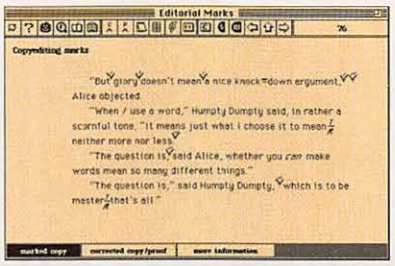
Search Me

Because there are many different ways to conceptualize how information may be linked and structured, it's often more efficient to find your reference by means of a search, rather than browsing. Both the word index and the subject index are written as hypertext; click on the boldface entry you want, and Editorial Advisor will take you to a card dealing with that topic. You can also use the Find button (the magnifying glass). Clicking on this button brings up a dialog box asking for the number of the card you want. Fortunately, since you're unlikely to know that number offhand, Option-clicking on the magnifying glass brings up HyperCard's standard message box, ready for you to enter a search text string.

Editorial Advisor provides movable bookmarks so you can wander around the stacks and then return to set locations. Unfortunately, there are only two of them, unalterably labeled Bookmark 1 and Bookmark 2; you cannot rename them, say, Abbreviations and Pronoun Agreement. They're like the electronic equivalent of using your fingers to hold your page: if you forget that you've already set Bookmark 1 and assign it to a second spot, you lose the first place. These bookmarks are also temporary; once you exit the program, the settings are lost. It would be nice to be able to set a number of more permanent markers so you could flip easily to those topics you refer to often.

Off-the-Shelf Info

Some parts of the reference section are quite strong, both in terms of the type of information provided and in the way it is presented. For example, click on the copyediting button, and you enter a stack of 15 cards beginning with a chart of copyediting marks. Clicking on any of these symbols brings up a card showing how that symbol is used to mark copy (see "Humpty Dumpty"). You can then move to a screen showing how the corrected copy would appear in print, or to a card explaining the symbol in more detail. Other routes lead to more thorough discussions of punctuation, including British and American variants on punctuation style. Where different conventions apply, such as the use or nonuse of the serial comma, Editorial Advisor indicates which standard references (*The Associated Press Stylebook and Libel Manual* or *Words into Type,* for example) favor which style. An appendix includes an annotated list of related words such as *compose, comprise,* and *consist,* or *adapt* and *adopt*—even some less obvious pairs such as *blatant* and *flagrant.*



Humpty Dumpty Clicking on the copyediting symbol for quotation mark insertion brings up this screen showing an example of marked copy.

Sometimes the explanations proffered seem too elementary to be valuable. The editor or writer who needs to review the parts of speech would be well advised to consider another profession. At the same time, copy editors of good conscience and skill will differ as to what constitutes useful reference material. (I blush to admit how often I still struggle with hyphens and en dashes, which another editor might wield with ease.) Delve beyond the definition of pronoun into any of 13 subtopics for that one part of speech. Try case, for example. In addition to comparing subjective and objective cases, Editorial Advisor gives an interactive illustration for each person—I/me, he/him, they/them, and so on.

Do It Yourself

The program is strongest in articulating the general rules of grammar and usage. Interpretation, necessarily, is left to the user. Still, one could wish for more illustrations to help with making tricky judgment calls.

Editorial Advisor's other great strength lies in features for customizing the program. It provides a house style guide, style sheets (you can maintain as many as six at a time), and house word list—finally, a place to stow all those individual decisions. And you can append notes to any card, for example, to remind yourself or your networked colleagues when house style deviates from Editorial Advisor's.

As befits a program of its type, Editorial Advisor's text is well written, both the on-screen cards and the brief manual. Don't be too quick to throw out your *Chicago Manual of Style,* though—Editorial Advisor is not a replacement for it or any of the other standard source books from which the program draws. But consider keeping Editorial Advisor at hand. It's earned a place among your editorial references.

—Marjorie Baer

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Output from LaserWriterII NT, 300 dpi.



Output from LaserWriterII NT with Accel-a-Writer upgrade, 1200 x 300 dpi, 150 lpi with 26 gray levels

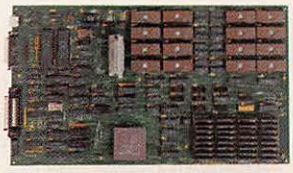
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HyperCard Conversion Utility

CONVERT IT 1.02

Pros: Efficient; good error handling; produces exceptional reports; first-rate support. **Cons:** ToolBook stacks require fine-tuning; external commands and functions need recoding. **Company:** Heizer Software. **Requires:** Mac Plus; 2MB of RAM; HyperCard 1.2.5. Asymetrix ToolBook 1.0 requires IBM PC or compatible; 2MB of RAM; Windows 3.0. **List price:** $199.

Last year Microsoft produced an impressive amount of media noise with its release of Windows 3.0, a semi-Mac-like operating system for IBM PCs and compatibles. At the same time Asymetrix, a Microsoft spin-off company, offered a product called ToolBook, a HyperCard-equivalent that works with Windows. Both firms hoped that these products together might help cure PC users of Mac envy; part of this hope was inspired by the belief that ToolBook would allow the rapid development of stacks (*books,* in ToolBook) for education, training, and other Mac-dominated areas.

Into the Blue

ConvertIt is a tool for automating the conversion of HyperCard stacks into ToolBook books. It was developed by the Hypermedia Group, a company that's been working with HyperCard since before you ever heard of it; ConvertIt is marketed by Heizer Software, known originally for templates and such for Microsoft Excel and Works. The Macintosh end of ConvertIt is a stack that runs under HyperCard, converting objects into HIFF format (for Hypermedia Interchange File Format), which the ConvertIt PC program translates into ToolBook. ConvertIt also translates HyperTalk scripts into ToolBook's OpenScript format at the same time, so buttons and other objects with attached scripts are functional in the ToolBook version of the stack.

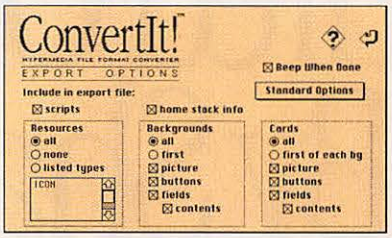
The procedure itself is fairly straightforward. You open the ConvertIt stack from inside HyperCard and select a file or files to export (you can pick a folder and check individual files to be converted). Before you export, you can also select elements of the stack to remain unconverted in the ToolBook target—for example, you might not want to export card graphics if you have some special color graphics planned for the PC book (see "Over We Go"). After you start exporting, ConvertIt chugs along at a rate of between 5K and 20K per minute (measured on a Mac IIcx); it's fastest at text and script conversion, and slowest on bitmaps.

You are left with a HIFF file, identified by the Finder as a MacWrite file type, that's typically 40 percent to 100 percent larger than the HyperCard original. You then transfer the file to PC format in one of three ways: direct serial-port link (the manual helpfully includes a cable wiring diagram), export over a network (copying into an AppleShare volume is most convenient), or Apple File Exchange direct-writing to MS-DOS format using an FDHD drive.

Finally, you open the HIFF file in ConvertIt's PC program. This requires selecting a few options (convert fonts or select default font, adjust size of bitmap bits for different PC graphics formats, import graphics or not), but otherwise it is a simple, automatic task. One of the most important features of ConvertIt is the conversion report book this process generates; ConvertIt lists, among other things, any errors it found in converting HyperTalk to OpenScript.

Card Tricks

The question about ConvertIt is basic: Does it actually work? Yes, it does, within the limitations imposed by the Windows and ToolBook environments. If a stack has been constructed entirely within HyperCard, practically everything converts smoothly. The resulting book in ToolBook can be a useful starting point for making an optimized PC version of the HyperCard stack; the fonts often look odd, unless you use Geneva exclusively on both the Mac and the PC, and the two systems' mismatched graphics (HyperCard uses bitmaps in a transparent layer while ToolBook uses *paint-Objects* that are part of the ToolBook *Page*) may mean that buttons in the ToolBook book are obscured by converted graphics. XCMDs and XFCNs are not converted. The developers at Hypermedia at one point considered offering a library of the 20 most useful Mac XCMDs as objects usable by ToolBook through Windows' Dynamic Link Libraries, but concluded that programmers would probably be happier originating their own workarounds for XCMD correspondence. ToolBook's OpenScript is a more serious attempt at a general-purpose object-oriented programming language than HyperTalk is, with a range of facilities that allow impressive effects not easily produced in HyperCard. As a result, any developer working in ToolBook will want to use the converted files as a starting point rather than as a finished product.



Over We Go The ConvertIt Export Options screen enables developers to select card elements and stack elements one at a time for conversion. This is necessary, not just convenient; if you're serious about developing in ToolBook you may want to replace some HyperCard constructs rather than merely translate them.

The Final Page

ConvertIt does everything you could reasonably expect such a program to do—where the program declines to convert an element, you can assume that the Windows environment is to blame. ConvertIt provides reason to believe, furthermore, that Windows 3.0 presents Apple with a considerable marketing problem; despite sometimes scrabbly-looking Windows fonts, most of the Apple sample stacks and *Macworld* SuperStacks contest stacks I converted looked fairly attractive in ToolBook. As a way to cut down on ToolBook programming time, or as an introduction to ToolBook functions for experienced HyperCard users, ConvertIt is one of the few authentic bargains in programming utilities.

—Charles Seiter

See **Where to Buy** *for contact information.*

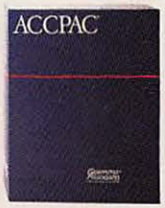
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WINDOW SHOPPING

by Lawrence Stevens

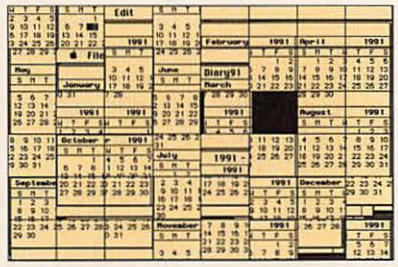
This month I look at a screen saver, a logic puzzle, financial software, and four other software packages.

After Dark 2.0

Keeping a monitor switched on while the computer is idle for too long can cause an image to be etched permanently on the screen. One way to prevent this is to install one of the many shareware or commercial screen savers that blank the screen after a period of inactivity. They usually display some kind of animation—shooting stars, bouncing balls—to let you know the computer is on.

After Dark 2.0 ($39.95 from Berkeley Systems) now gives you the largest number of animations to choose from. Among the 30 modules are clocks (analog, digital, antique, and modern), flying toasters, worms, and a puzzle (see "Turning Your Screen Image into a Puzzle"). You can modify various elements (size, speed, and so on) of the animations and easily create your own designs by combining several modules into multimodules. The manual includes information for advanced users who want to use After Dark as a shell for creating their own animations.

The primary alternative to After Dark in commercial screen savers is Pyro (from Fifth Generation Systems), which in the latest version provides seven options including a clock and fireworks. Because screen-savers, even good ones like Pyro, can get boring after a while, I recommend After Dark. Its variety of displays might make your day a bit more interesting.



Turning Your Screen Image into a Puzzle While most screen savers blacken the screen, some of After Dark's displays, like this puzzle, distort the screen image. Because the display is constantly in motion (the pieces of the puzzle move around), the image cannot be etched onto the screen.



RON CHAN

3 In Three 1.0

3 In Three ($49.95 from Cinemaware) is a set of about 60 challenging math, logic, spatial, and word skill puzzles with pleasant graphics and sound.

B's in Her Bonnet, a logic puzzle, involves a series of boxes with open or closed doors. Clicking on any box makes its door open and makes the doors on adjoining boxes open and close. You must select the boxes in the correct order so that all the doors stay open.

To complete other puzzles in the program, you unscramble letters or crack a code using arithmetic. The puzzles are fun but difficult. Sometimes it's even hard to understand the rules. (The manual says, "if you aren't sure what to do, then figuring out what to do is part of the puzzle.") As a result, this package is for the serious puzzle fan who is willing to devote a good deal of time and sweat to it.

Wouldn't You Rather Be Rich? and Financial Independence, As You Like It 2.0

This package includes the 300-page book *Wouldn't You Rather Be Rich?* and its accompanying software, Financial Independence, As You Like It (software and book for $49.95, book only for $13.95, from Cherokee Publishing Company).

This is not, as the book title suggests, a get-rich-quick program. Rather it is a comprehensive guide to all facets of financial planning, from food-shopping tips to Keogh plans. At the end of each chapter in the book there is a Progress Check, a relatively simple (usually five- or six-line) worksheet that helps you determine such things as your net worth, liquidity, and tax bracket. The software contains a computerized version of each chapter's Progress Check.

For many people, the book without the software would be the better buy. Most of the Progress Checks can be completed with just a pencil and calculator; with a spreadsheet program, you can replicate any of the Progress Checks in minutes. If you want to keep on top of your finances, the book can help, but the software is not necessary.

EasyKana

EasyKana ($199 from HyperGlot Software) is a HyperCard stack that teaches the basics of the two main Japanese phonetic alphabets: katakana, used mostly for non-Japanese words, and hiragana.

(continues)

The software includes writing exercises that show, through animations, how to draw each character stroke by stroke. There are also drills in which you have to match Japanese characters with their English transliterations (such as *gi*). Each word card contains a Japanese word, the English translation, and a drawing that illustrates the word. You can also have the program vocalize the Japanese word. This vocalization, however, is the weakest aspect of EasyKana. Macintalk's drunken-sounding voice simply doesn't provide the accent and inflection accuracy you need when you are trying to learn a foreign language.

Learning to write Japanese characters is in itself a major accomplishment, and EasyKana is a great help, but if you're interested in learning to speak Japanese you should take a class or use a tape recording.

FolderJump 1.1

FolderJump ($49 from Cra Z Software) is one of those rare programs that do a relatively simple job but can make your Mac much easier to use. The biggest problem with the Mac's hierarchical file system is that you often have to click your way through multiple levels of folders in order to open or save a file. With the FolderJump INIT installed, the Mac's Save and Open dialog boxes include a pop-up menu with your most-used folders listed. When you select a folder from the dialog box, you immediately jump to that folder without going through the hierarchy. Also, any time you save or open a file, that file's folder appears on FolderJump's pop-up menu. You can reopen or close that folder by selecting its name from the menu at any time. These folders appear in the dialog box until you shut down the Mac.

When you move from one volume or drive to another using FolderJump's Open or Save dialog boxes, and later return to the original volume, you will find yourself in the same folder you were in before you left that volume or drive.

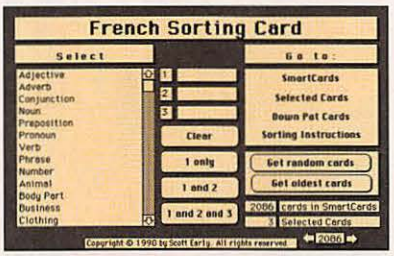
FolderJump can save you thousands of mouse clicks.

Fractal Attraction 1.0

Iterated function systems (IFS) is a means of creating complex artwork



Five Ways to Learn Japanese Learning Japanese is not easy, but EasyKana provides five ways, represented by the five buttons, to learn the language. Writing provides animations that show how to write characters. Flash provides drills in which you match characters with English transliterations. Words helps you build a vocabulary; Worksheet allows you to print a practice sheet; and History displays a brief history of the language.



Selecting Flash Cards SmartCards lets you limit the cards displayed. You select up to 3 of the 30 parameters available in the window at the left of the screen. SmartCards will display only the cards that fit the parameters.

by placing thousands of dots at the coordinates of an equation as it is solved iteratively. The images can look like real-life objects such as trees, clouds, or dragons, or they can be abstractions.

Fractal Attraction ($49.95 from Sandpiper Software) is a better program for nonmathematicians than IFS Explorer from Koyn Software is (see *Window Shopping,* March 1991) because it enables you to draw fractals without understanding the concepts behind them.

In both IFS Explorer and Fractal Attraction, you enter equations in a spreadsheetlike window, and the program generates a fractal based on that equation. Most equations result in interesting fractals, but in IFS Explorer, to find the equation for a specific figure, such as a leaf, you have to understand how fractals work or be willing to spend hours in trial and error. Fractal Attraction solves this difficulty by automatically entering equations based on scanned or drawn images. You paste in an image, use a tool to trace its outline, and Fractal Attraction enters the equation that will result in a fractal that looks like the image.

If you want to use fractals in artwork but don't want to learn the mathematics behind them, Fractal Attraction is your best buy.

SmartCards

SmartCards ($25 from SmartCards Software) is the third HyperCard foreign-language flash-card program that I've looked at. The others were VocabuLearn/CE from Penton Overseas and MacFlash Cards from The Language Quest Software Company (see *Window Shopping,* May 1990 and June 1990).

All three of these programs share a number of characteristics. They all first display either an English or foreign word on one side of the screen. Then after you remember or guess the foreign or English equivalent, you click to see the correct answer.

The major differences between the three programs lie in the control you have in selecting your practice word cards. In this regard, SmartCards is better than its two rivals.

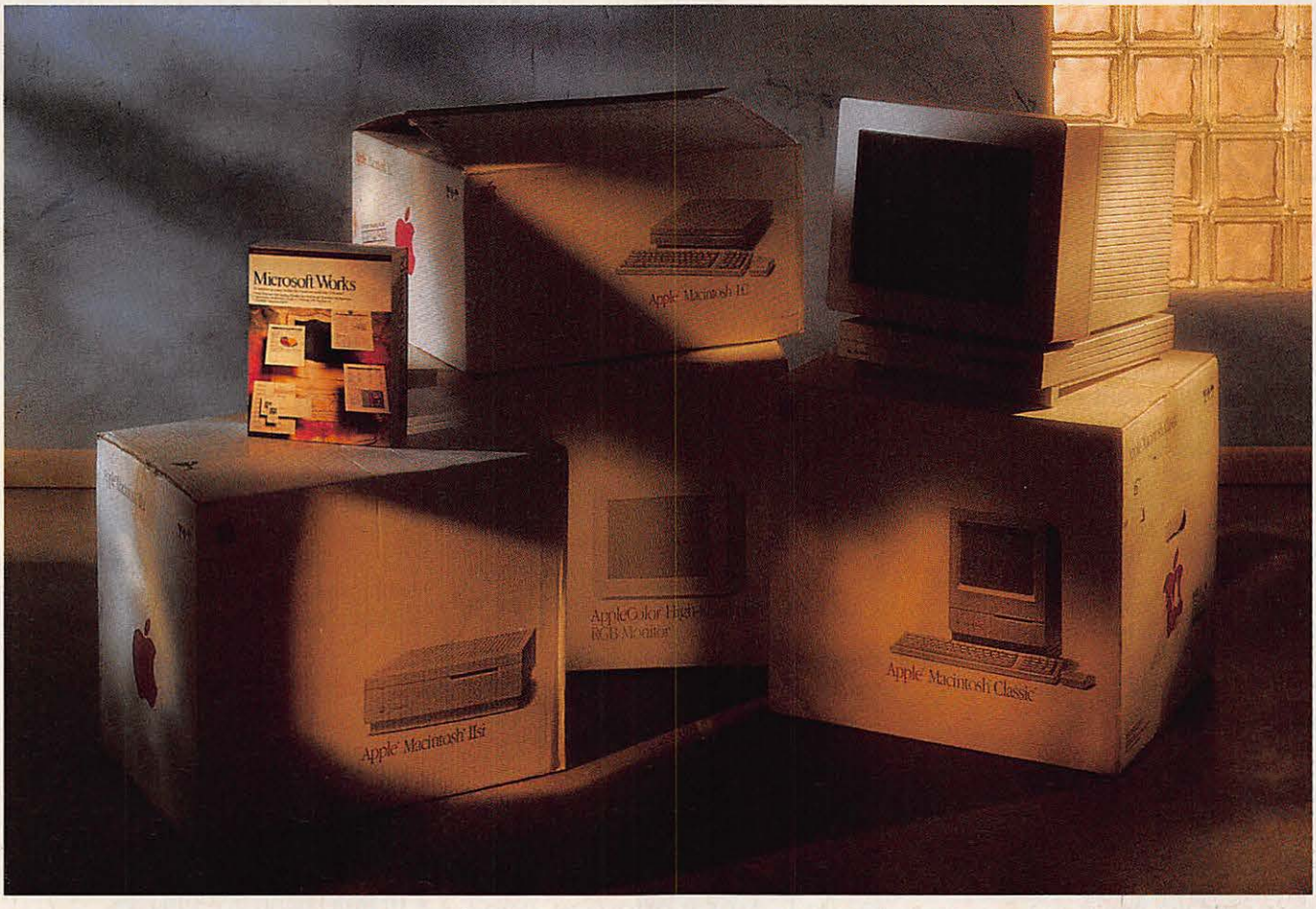
First, SmartCards lets you choose up to three parameters—such as noun, travel, business—for selecting practice cards (see "Selecting Flash Cards"). So you can, for example, practice with only cards that contain nouns and relate to food or business.

Second, SmartCards does a better job of sorting cards based on your correct or incorrect answers. For example, you can set the program to display any cards that have not been answered correctly a given number of times in a row. You can also sort the cards in descending order based on the percentage of incorrect answers. Or SmartCards can display only the cards you haven't seen for the longest period of time.

So far, the company makes stacks for French, Spanish, German, and Italian (Russian and Portuguese are in the works). If you're studying one of these languages, SmartCards' superior ability to manipulate cards can provide an effective way to learn vocabulary. M

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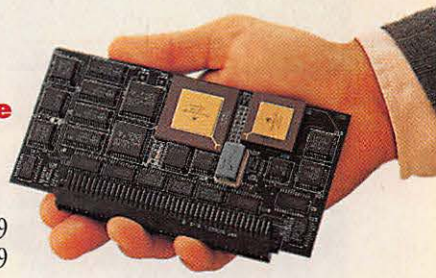
Write to: CDA Computer Sales 1 CDA Plaza P.O. Box 533 Califon, NJ 07830 #28-05

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Take Your Macintosh to the Top with Performance Upgrades from DAYSTAR DIGITAL

DayStar Cache Cards

This new generation of cache cards allows you to plug even more speed into the Mac IIci cache connector. From the proven FastCache IIci to the "blazing fast" 50 MHz PowerCache IIci, get the speed you need at the price you can afford. If you already have a FastCache, trade it in for big savings towards the PowerCache of your choice.

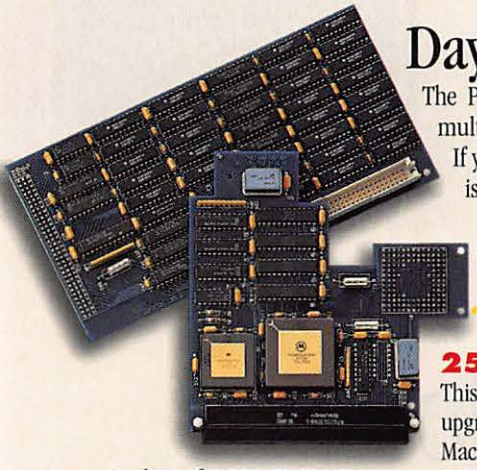


Cache Cards for Mac IIci

FastCache IIci
This super fast 64K static RAM cache is the economical performance upgrade with response time up to 70% faster! $279

40 MHz PowerCache
Get Macintosh IIfx processing speeds. Stay under budget and still fly like the wind.
Without Math Chip $949
With Math Chip $1169

50 MHz PowerCache
This turbocharged 50 MHz cache card turns your computer into the fastest Mac alive.
Without Math Chip $1689
With Math Chip $1999



PowerCard 030 for Mac II, IIx, IIcx

DayStar PowerCard 030

The PowerCard 030 delivers maximum speed at an affordable price. The on-board 32K RAM cache eliminates multiple processing wait-states; the 50 MHz configuration triples the performance of a Mac II!

If you start with a 25 or 40 MHz board, you can always upgrade to 50 MHz later. Optional 68882 math chip is available for spreadsheet recalcs, 3D and scientific applications.

PowerBundle IIcx. Some Mac IIcx's require that a socket be added to the motherboard. In this case CDA, in conjunction with DayStar, offers a unique motherboard exhange program. To eliminate down time, CDA will overnight you a new socketed IIcx motherboard and the PowerCard of your choice. Simply return your IIcx motherboard and install the new one. Please call CDA for additional details.

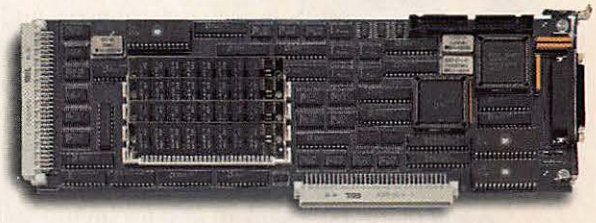
25 MHz PowerCard
This is an ideal low-cost, entry-level upgrade for your Mac II, IIx or IIcx.
Macintosh II, IIx, IIcx $1099
With Math Chip $1249

40 MHz PowerCard
IIfx class performance at nearly half the cost of Apple's upgrade path.
Macintosh II, IIx, IIcx $1389
With Math Chip $1599

50 MHz PowerCard
The fastest 68030 processing speed available for the Mac family.
Macintosh II, IIx, IIcx $1899
With Math Chip $2199

DayStar SCSI PowerCard

Break the hard drive performance bottleneck with the SCSI PowerCard. This NuBus card gives all drives the ability to perform like super fast RAM disks, getting data to and from your applications at lightning fast speeds. Works with all standard drives, including opticals, SyQuest and CD-ROM. In fact, the SCSI PowerCard is so powerful that even slow opticals can perform faster than a WrenRunner II—*the world's fastest drive*. Database, graphics, or wherever you have disk intensive tasks or large files, this easy-to-install NuBus card is the ideal performance upgrade for Macintosh users. The buffer uses standard 100 nanosecond Mac II SIMMS (0 MB Cache/Buffer requires memory).



SCSI PowerCard for NuBus

SCSI PowerCard
0 MB Cache/Buffer $1099
4 MB Cache/Buffer $1349
16 MB Cache/Buffer $2169

The Complete Line of DayStar Performance Upgrades are available through CDA Computer Sales!

Ad# 28-05

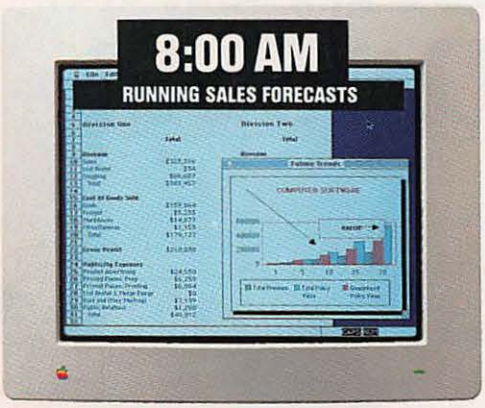
US/Canada
800-526-5313

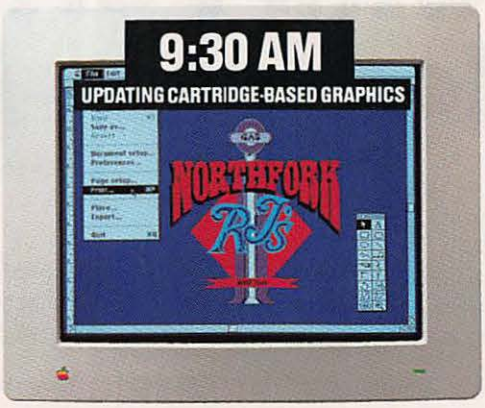
The Magic of Mac, The Power of People
CDA Computer Sales

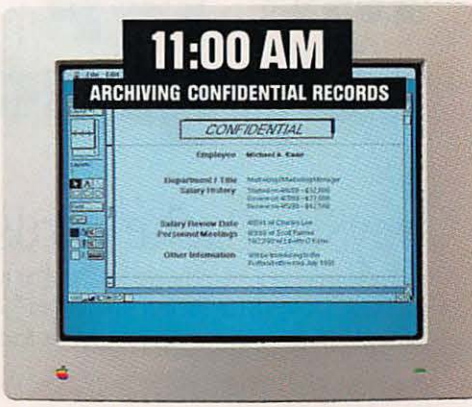
Outside US/NJ
908-832-9004

Circle 32 on reader service card

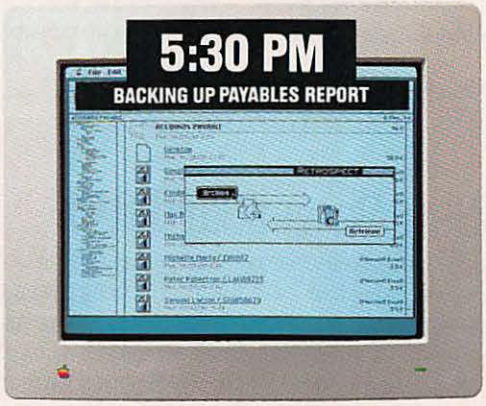
A Day In The Life Of





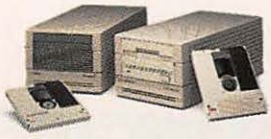








MacinStor® Erasable Optical.



Imagine a storage device that runs at near-Winchester speed, has the capacity to accommodate massive databases, and the versatility to do not just one storage task, but a dozen.

The Eddy Award-winning MacinStor Erasable Optical is just such a device. A dynamic storage system that (1) provides infinite near-line storage capacity, (2) is the most reliable and convenient data backup and archiving solution, (3) lets you carry or send massive files, (4) functions perfectly as a primary storage device, (5) gives you lock-it-away data security, and (6) can immediately take over for a downed hard drive without missing a beat.



MacinStor Erasable Optical subsystems are multi-talented because they're multi-featured. These bootable, random access systems deliver instant access to files, and seek times as fast as 35 ms. They're AppleShare® and A/UX™ compatible. And you get your choice of 650 MB or 1 GB cartridges, with a certified data life up to 25 years. What's more, you get the most comprehensive set of utilities software, including Retrospect,® the EDDY Award-winner for backup.

Day or night, as a great tool for productivity and a great device for data protection, MacinStor Erasable Optical is a very timely choice. For more information, call (408) 879-0300. Storage Dimensions, 2145 Hamilton Avenue, San Jose CA 95125.

STORAGE DIMENSIONS

Sony-based products now available!

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To be called circle 176 on reader service card
For literature circle 127 on reader service card

NEW PRODUCTS

Edited by Mary Margaret Lewis

This section covers Macintosh products formally announced but not yet evaluated by Macworld. All prices are suggested retail. Please call vendors for information on availability.

HARDWARE

16MB SIMMs

16MB composite SIMMs designed with industry-standard 30-pin construction and offer 70-nanosecond RAM access. These units appear to the operating system as standard 16MB increments. Contact Vendor for price. Newer Technology, 316/685-4904.

The Bat

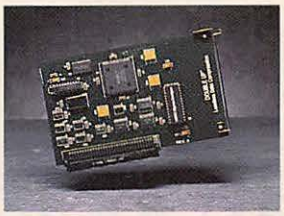
Input device consisting of two ergonomically designed seven-key keyboards that enable you to enter characters, words, phrases, and macros by pressing chordic key combinations. Each Bat keyboard has all the functions of the standard 101-key keyboard; the Bat keyboards can be joined together and used instead of a standard keyboard, or be attached to the sides of the standard keyboard and used with it. $269. Infogrip, 504/336-0033.



The Bat

DoubleUp

Lossless compression add-in board for mass storage. Comes bundled with DiskDoubler 3.0 compression software. Uses a compression algorithm that compresses files whether they contain images, nonimage data, or application programs without data loss or transformation. $229. Sigma Designs, 415/770-0100.



DoubleUp

HD PortaDrives

Portable hard drives designed to provide average access time of 15 milliseconds. Drives measure 8 inches long, 6 inches wide, and 2 inches high. Operates with SCSI interface; has universal AC power supply with autoswitching for 100V to 260V power requirements. Available in 200MB and 100MB units. HD PortaDrive 200 $1995; HD PortaDrive 100 $1195. CD Technology, 408/432-8698.



HD PortaDrives

ImageMaker

PostScript imagesetter designed to create commercial-print-quality images. Uses professional process-color screens and has features for automatic dot size adjustment, automatic film loading and punching, and the option of humidity and temperature controls in the unit. $125,000. Purup North America, 612/646-3388.



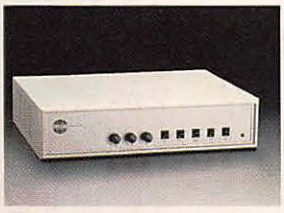
ImageMaker

Killy Classic Clip

Low-profile expansion bus connector designed to create an expansion slot for the Mac Classic so that it can support large-screen monitors, Ethernet connectivity, and accelerator boards. $49.95. Killy Corporation, 212/995-0560.

RGB VideoLink 1450AX

Autosync scan converter that transforms high-resolution computer graphics into television format. Automatically synchronizes to any computer signal that has a horizontal scan rate from 21.5kHz to 80.0kHz. $14,995. RGB Spectrum, 415/848-0180.



RGB VideoLink 1450AX

Spectra Star 400 Printer Series

Series of PostScript-compatible color printers. Model 410 comes with 1MB of RAM, has built-in emulation of the Mitsubishi G370 printer, and can be used with host-based PostScript-compatible software. The 4MB Model 420 adds a variety of software packages that produce HPGL (Hewlett-Packard Graphics Language) output files. Model 430 adds a board based on the Intel 960 RISC processor and has 6MB of RAM plus AppleTalk connectivity; Model 450 adds a film recorder to create 35mm color slides. Model 410 $5995; Model 420 $6595; Model 430 $7995; Model 450 $14,995. General Parametrics, 415/524-3950.



Spectra Star 400 Printer Series

SOFTWARE

Berean Bible Search

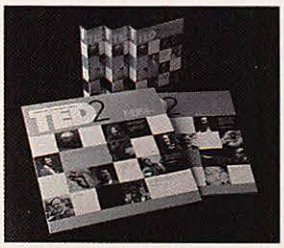
Electronic concordance of the Bible that enables the user to do a keyword search on biblical texts; has a case-

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sensitive lookup feature, book-by-book counts of individual words, and topical indexes; and can perform word-combination searches using Boolean logic. Contains a text editor for notes, thoughts, and study outlines. 1MB min. memory. $50. Kim David Software, 214/963-8673.

The Best of TED 2

Compilation of presentations made by more than 25 expert technologists and artists who were speakers at the Technology Entertainment Design Conference held in February 1990. Contains animation footage from Alan Kay's Vivarium project; Jaron Lanier demonstrating virtual reality; John Sculley demonstrating the Knowledge Navigator multimedia simulation; and other historic footage including Lyndon Johnson's "Daisy" commercial from the 1964 presidential campaign. 1MB min. memory. Set of 2 videodiscs with a HyperCard stack $200; 3 VHS cassettes $175. The Voyager Company, 213/451-1383, 800/446-2001, 800/443-2001 in California.



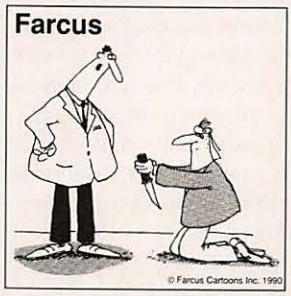
The Best of TED 2

EHelp

A context-sensitive hypertext engine for integration with Macintosh applications. Includes EHelp Compiler, EHelp Tester application, documentation, and examples. Includes license for single Macintosh application. 128K min. memory. $350. Endeavor Systems, 919/233-8818.

Farcus, Business as Usual

Seven-disk set of 100 encapsulated PostScript cartoons accompanied by a book of camera-ready art. Cartoons were created by David Waiglass and Gordon Coulthart. All drawings can be imported into any page-layout program. 1MB min. memory. $299. Farcus Cartoons, 613/235-5944.



Okay, okay. No more Japanese management seminars.

Farcus, Business as Usual

Fine Art Impressions Art Library

Collection of 186 drawings in 17 different categories. Set comes on 14 disks and includes a template for positioning and altering images within page-layout and drawing programs, directions for designing a variety of layouts, and an image index. 1MB min. memory. $179.95. Best Impressions, 805/984-9748.

GrafEq

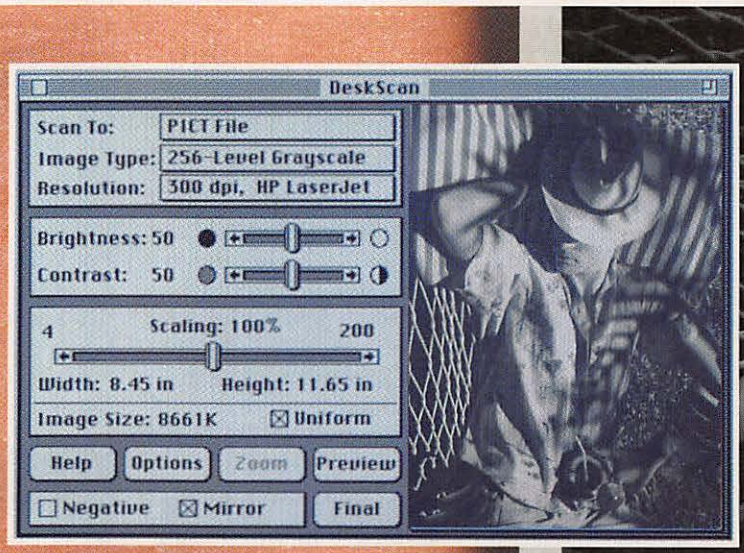
Applications for mathematics students in grades 10 through 12, and for first-year university students. Students enter any equation, in any form, and program graphs that equation. Algebraic, polynomial, trigonometric, radical, and hyperbolic trig functions are built in. Available only to schools and educational institutions. 512KE min.

With the HP ScanJet Plus, you've

The HP ScanJet Plus scanner provides 8-bit photographic-quality scanning.

That means 256 shades of gray for the hottest-looking output from your Mac. And it's so easy, too. At the click of a mouse, you can get negative or mirror images, as well as scaling in 1% increments from 4-200%. All for $2,190;* about what you would expect to pay for a 4-bit scanner.

So if you want the richest, most detailed images from your Mac, you've got it made with Hewlett-Packard. Call **1-800-752-0900, Ext. 1005** for your authorized HP dealer.



For all its amenities, ease of use, good image quality, and low price, *Publish!* recommends the HP ScanJet Plus as their "Best Buy."

HEWLETT PACKARD

memory. School site license $200. Pedagoguery Software, 604/638-8606.

Hamlet

Software that provides finance and profit information to help user decide whether to buy or lease an item. Takes into consideration factors such as alternative minimum tax, residuals, tax rates, debt, and discount rates. Includes break-even analysis on discount rate, rents, and other variables. 1MB min. memory. $695. Decision Systems, 612/338-2585

History on CD-ROM

CD ROM that includes the full text of 107 books relating to U.S. history, as well as more than 1000 images, tables, maps, and photographs relating to historical events. Comes in leather bound case with comprehensive user manual. 1MB min. memory. Bureau of Electronic Publishing, 201/808-2700, 800/828-4766.

HyperTax Tutor

HyperCard application designed to act as a tax tutor. Gives line-by-line explanations of tax forms and tax-saving advice. Contains several illustrated examples of IRS forms and can be used as a support tool for people who are working with MacInTax and TurboTax software. 1MB min. memory. $99. SoftStream International, 609/866-1187.

JapanEase

Series of HyperCard 2.0 stacks that use animation and sound to teach the Japanese katakana alphabet; words in the Japanese language borrowed from other languages; and other information, such as how to tell time and dates and count numbers and yen in the Japanese system. 1MB min. memory. $99.95. Qualitas Trading Company, 415/848-8080.

Keyboard Pathology Series

Set of three HyperCard modules designed to assist pathologists in classrooms and the lab. TextStack contains *Robbins Pathologic Basis of Disease* (W. B. Saunders, 1989); QuizBank includes more than 2400 questions covering all aspects of pathology; Video Index contains more than 1600 images taken from the University of Utah's Slice of Life videodisc produced by the university annually. Modules may be purchased separately or together. 1MB min. memory. Set $480; single-user TextStack and QuizBank $180; Video Index $120; site licenses available. Keyboard Publishing, 215/275-2729.

Kid Pix

Children's color paint program that combines an assortment of creative paint tools with sound effects. Features a simple-to-use palette of paint, draw, and special-effects tools; a collection of magical erasers; and a talking alphabet. Each tool or brush has its own sound effect. Users can also record personal greetings or sounds to add to an image. 1MB min. memory. $49.95. Brøderbund, 415/492-3200.

MasterFinder

Disk-management utility that's compatible with network software; allows user to copy, move, or launch files from any node on a network. Utility contains

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got it made in the shades.



*Suggested U.S. list price. © 1990 Hewlett-Packard Company PE12004

an application- and document-launch feature as well as the ability to open documents that have been created by other applications; A/UX 2.0–compatible. 1MB min. memory. $99. Tactic Software, 305/378-4110.

Meeting Meter

HyperCard program that acts like a taxi meter for meetings. You enter the confidential salary information for each meeting participant; you have the option of entering related information such as room rental and other costs. The program displays a large meter showing hourly costs associated with the meeting. You can set meter to sound an alarm when the meeting goes over a preset cost limit. 1MB min. memory. $29.95 plus $4 s/h. Institute for Better Meetings, 415/857-1757.

Octavo TypeChart

Program that enables you to print a personalized catalog of all the typefaces you have in your system. Enables you to print a font list showing FOND numbers, installed sizes, and resource types; print a specimen list with each font name set in its respective typeface. Program identifies FOND number conflicts. Enables you to make direct on-screen comparisons between fonts using TypeChart's screen-splitting feature. 1MB min. memory. $89.95. Octavo Productions, 3623 Sunnycrest Drive, Ste. 800, North Vancouver, B.C., V7R 3C5, Canada.

Performance Mentor 2.0

Software that acts as adviser on daily employee-management issues ranging from coaching and setting objectives to performance feedback and appraisals. Based on data culled from more than 300 research studies. Takes into account various current theories of management. All advice, tips, and hints may be printed. 1MB min. memory. $395. Performance Mentor, 415/969-4500.

Studio Vision

MIDI sequencer for recording and editing MIDI and digital audio information. Can record digital audio tracks in sync with MIDI sequence information; uses Digidesign's Sound Tools to record and play back 16-bit sound. Has 16 Audio Instruments to which digital audio tracks can be assigned, and allows independent control of pan and volume for each audio instrument. 5MB min. memory. $995. Opcode Systems, 415/369-8131.

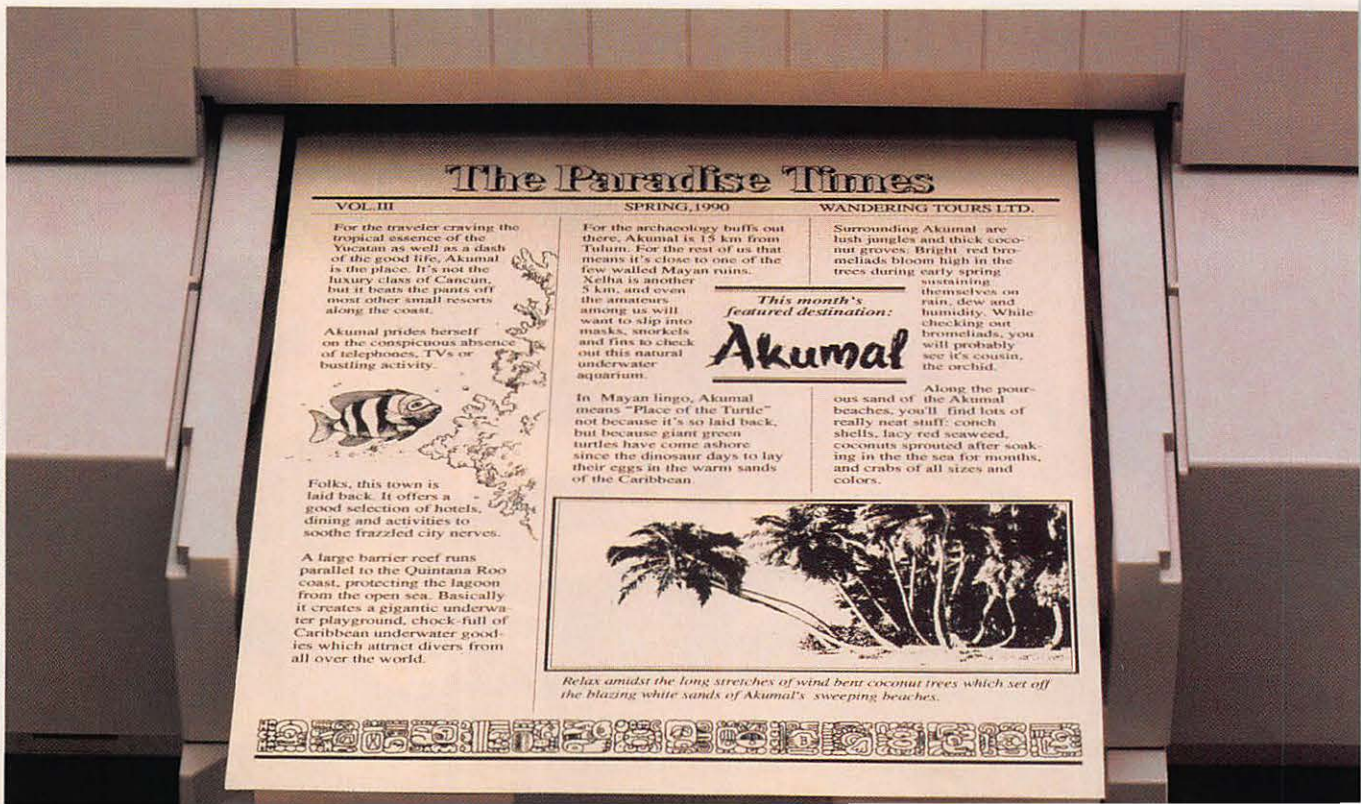
Taste

Word processor with built-in desktop publishing capabilities such as page layout and multiple column. Lets you set left and right pages separately; enables matching and mirroring for left or right; and includes a layout box that lets you control the columns, the margins, and the range of pages you are working with. Has commands for wrapping text around irregular- and regular-shaped images. Lets you import PICT and EPS files. Includes the DeltaGraph drawing package, address book database, and point-and-click mail-merge facility. 1MB min. memory. $149. DeltaPoint, 408/648-4000.

TrustMaker

Application designed to help you prepare your own legally valid living trust

With the HP DeskWriter, you can



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Documents created using Microsoft® Word and Aldus PageMaker®
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without an attorney. Program guides you through the trust-making process and lets you make up to 28 specific gifts of trust property to any individual or group of people; provide for minor beneficiaries by leaving property in trust or by using the Uniform Transfers to Minors Act; appoint an initial trustee, a successor trustee, and an alternate successor trustee; and print a schedule listing the property to be transferred to the trust. 512K min. memory. $99. Legisoft, 408/244-3300.

The Viper

Data security utility that erases hard and floppy disks by overwriting the data multiple times according to guidelines from the National Security Agency. Once erased in this manner, data can't be accessed by retrieval programs. 1MB min. memory. $49.95. Systematic Computer Services, 513/275-2937.

Wayne Gretzky Hockey

Hockey-simulation program that includes animated referee calls, digitized sound effects and video fight sequences, and the ability to create and edit your own team roster. Lets one or two players control any team member in real time, play and coach simultaneously, coach from the bench, or watch the computer control both teams. Includes a playback feature that lets you study game play using variable-speed instant-replay and slow-motion feature. Rates players according to 11 skill categories and tracks their performance. 1MB min. memory. $54.95. Bethesday Softworks, 301/926-8300.



Wayne Gretzky Hockey

ACCESSORIES

Anchor Pad for Macintosh

Accessory designed to keep the Mac anchored to a desktop without marring the desk's surface. Available in a 10-by-12-inch footprint for the Plus, SE, and Classic and a 14-by-16-inch footprint for the Mac II series and LC. Consists of a baseplate that connects to an adhesive pad and bolts into footings installed at the bottom of the Mac. Lock and key provided to secure the Mac to the baseplate. Installation required. $110 and up, depending on configuration. Anchor Pad International, 805/658-2661, 800/426-2467, 800/626-2467 in California.



Anchor Pad for Macintosh

Dust Covers

Customized dustcovers for Mac Classic, LC, and Hsi. Made of a washable cotton-polyester-blend fabric; available in gray, red, royal blue, brown, navy, and tan.

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have it all. (But keep it to yourself.)



The HP DeskWriter printer puts laser-quality printing right at your fingertips.

With a small size and a $995* price tag, the DeskWriter printer easily fits on your desk and in your budget. And its advanced 300 dpi inkjet technology lets you print sparkling text and detailed graphics.

The DeskWriter is also designed for easy use with your Macintosh, and has both serial and AppleTalk interfaces. It even includes scalable and outline fonts. Combine that with the DeskWriter's whisper-quiet operation, and keeping it to yourself will be that much easier. So call **1-800-752-0900, Ext. 1004** for your authorized HP dealer.

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Where In The World



MACWORLD EXPO/VIENNA
Growth in number of Macintosh computers purchased in Austria during 1990: 62%



MACWORLD EXPO/HELSINKI
Growth in number of Macintosh computers purchased in Finland during 1990: 67%



MACWORLD EXPO/ASIA
Growth in number of Macintosh computers purchased in Hong Kong during 1990: 37%



MACWORLD EXPO/EUROPE
Growth in number of Macintosh computers purchased in The Netherlands during 1990: 56%



MACWORLD EXPO/BERLIN
Growth in number of Macintosh computers purchased in Germany during 1990: 66%



MACWORLD EXPO/NEW ZEALAND
Growth in number of Macintosh computers purchased in New Zealand during 1990: 38%

The Macintosh market continues to explode. And MACWORLD Expo is growing right along with it.

According to International Data Corporation, the installed base of Macintosh computers has skyrocketed 800% to 4.4 million units since 1985. And that number is expected to almost triple by 1994.*

Everywhere.

At the same time, MACWORLD Expo has gone from a single show in 1985 to 17 international expos today.

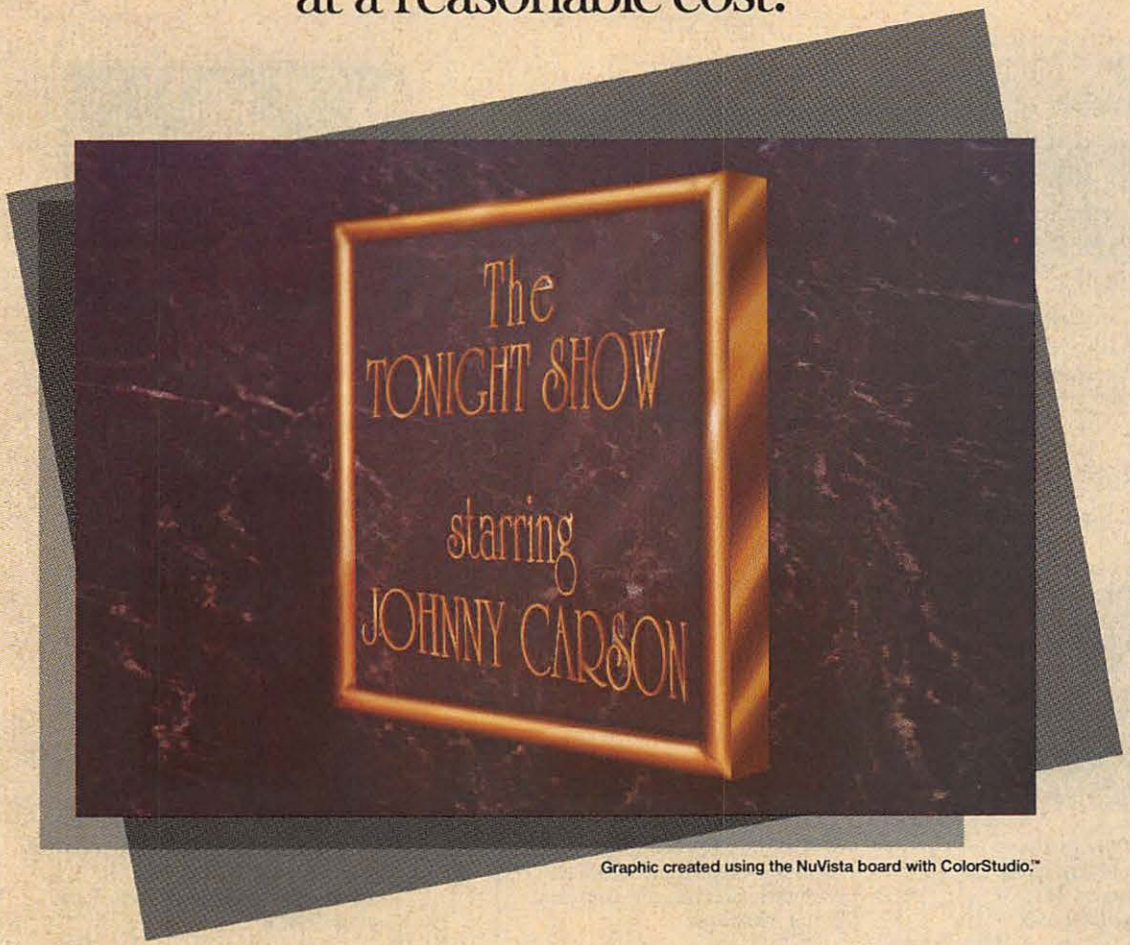
The fact is, no matter where in the world you find computer users, you'll find MACWORLD Expo—from Auckland to Amsterdam, Sydney to San Francisco, Toronto to Tokyo, Boston to Birmingham.

MACWORLD Expo brings together the people and the companies who are going places. Some come to share tips and techniques. Others to exchange ideas and innovations. Everyone to see, touch, try, and buy the latest in Macintosh products and services.

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* SOURCE: International Data Corporation, August 1990.

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Graphic created using the NuVista board with ColorStudio.™

The Post Group uses a Truevision NuVista video card to **capture** their ideas and shape them into high quality productions. The same power can transform your Mac® II into a broadcast-quality video production system.

And now with advanced features like chroma-keying and enhanced video overlay on the Truevision NuVista+, it's easy for you to **communicate** in ways more exciting than ever before.

For as little as $2,995, the Truevision NuVista+ provides everything you need to **convince** your audience with a creative, professional product.



Linda Rheinstein
The Post Group
Los Angeles, California

"Advanced graphics on the desktop is here. You can't ignore it. And you shouldn't. The benefit is more power to create."

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Circle 38 on reader service card

Where In The World



MACWORLD EXPO/VIENNA
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At the same time, MACWORLD Expo has gone from a single show in 1985 to 17 international expos today.

The fact is, no matter where in the world you find computer users, you'll find MACWORLD Expo—from Auckland to Amsterdam, Sydney to San Francisco, Toronto to Tokyo, Boston to Birmingham.

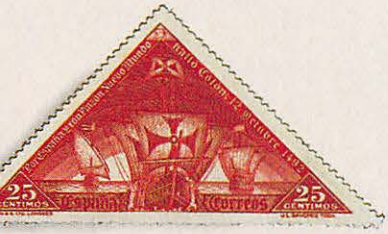
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Growth in number of Macintosh computers purchased in Sweden during 1990: 73%



MACWORLD EXPO/TOKYO
Growth in number of Macintosh computers purchased in Japan during 1990: 36%



MACWORLD EXPO/AUSTRALIA
Growth in number of Macintosh computers purchased in Australia during 1990: 22%

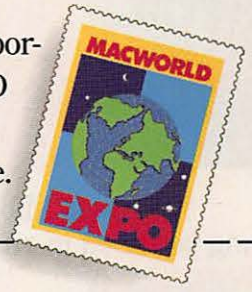


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Quick Tips

VIRTUAL MEMORY UPGRADES, TABLE SHADING, LONG ADB CABLES, AND MORE

BY LON POOLE

Several months ago Evan M. London, a schoolteacher in Hastings On Hudson, New York, submitted a tip that appeared in the January 1991 issue. His fourth-grade students appreciated how he applied what he'd learned to the real world, but the fact that he was getting paid for his tip really impressed them. So much so that two of his students, Kristin Capeono and Julia DiSalvo, sent in a tip of their own.

"We play games, make stacks, and paint pictures on our fourth-grade teacher's Mac computer. We have figured out a trick for GunShy. You press the Option and ⌘ keys, and you will see the squares that can be eliminated. Those squares will be black and the others will be regular white. That's a way to find matches. Otherwise it is pretty hard."

Because GunShy is a HyperCard game, their tip applies to many other HyperCard games and to other HyperCard stacks as well. When you press the Option and ⌘ keys, HyperCard shows you the whereabouts of all buttons. Hidden buttons are often important hot spots in HyperCard games. In other stacks you can't always tell what words or pictures to click; this trick clues you in. A similar trick, which may be less useful in games, is pressing ⌘-Shift-Option to reveal all text fields. Text in fields can be searched using HyperCard's Find command (Go menu), but not text that's been made part of the picture.

Partly Bad Disks

Q Two of us recently lost large, important documents, getting messages that said, "... unable to write ... due to bad media ... " I figured that was because I recently purchased blank disks at bargain rates. A co-worker tells me his IBM PC scans new disks during initial formatting to locate bad sectors and then forbids the use of the bad sectors. Does the Mac do that? If not, can I buy software that will? Our lab and office are terrified of another such loss.

Larry Horstman
Miami, Florida

A The Mac won't initialize (format) bad sectors on any disk. On a hard disk, it marks bad sectors as unusable. If the Mac finds a bad sector while initializing a floppy, however, it rejects the whole floppy.

What happened to you on the Mac could just as easily happen on any computer. Your disks developed bad sectors during everyday use. In other words, they wore out (prematurely). Good-quality disks take years to develop bad sectors. You can find and mark bad sectors that develop with age by using a disk utility program such as Central Point Software's MacTools Deluxe. However, I recommend you replace floppies that go bad. It's simply not worth the bother of limping along with them.

As you're probably aware by now, the only sure protection against disk failure is to regularly make backup copies of all information you can't



stand losing. Without current backups, you must live in terror.

Icon Change

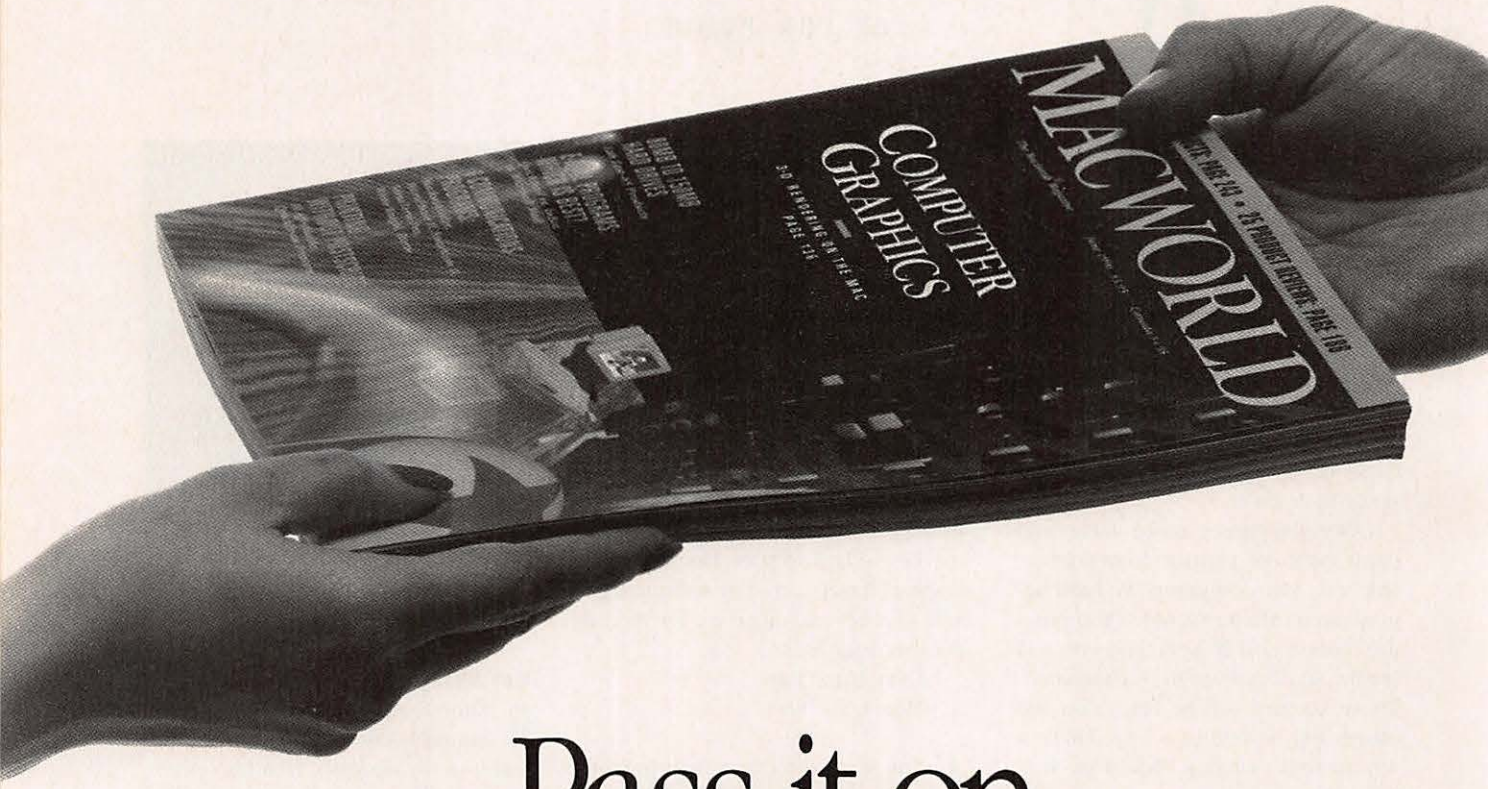
Q After reading *Quick Tips* in the January 1991 issue, I tried rebuilding my desktop. I had no problem rebuilding, and it improved file copy times greatly. After rebuilding my desktop, I opened the StuffIt Deluxe folder, and to my surprise the icon had changed. Could rebuilding have caused this?

Chris Ptacek
Bellmore, New York

A Yes. Before rebuilding, you must have upgraded from StuffIt 1.5.1 to StuffIt Deluxe. When you copied StuffIt Deluxe to your disk, the Finder checked its database in the invisible Desktop file to see if it already knew the program's icon. But the Finder doesn't compare program icons, it compares four-letter signatures of the programs. The two versions of StuffIt have the same signature, so the Finder didn't update the icon. The only way to remove old icons is to rebuild the

(continues)

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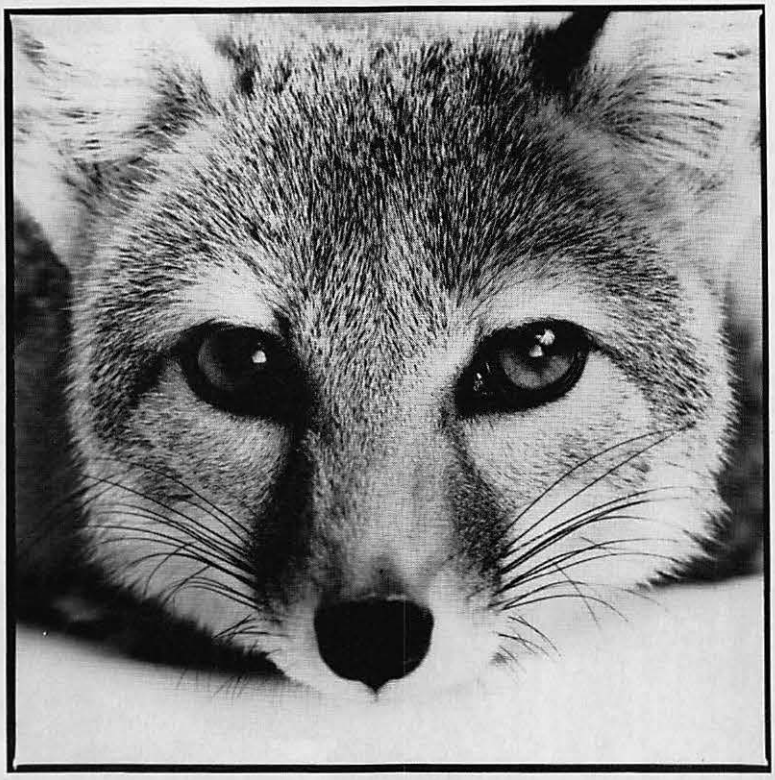
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Desktop file. Then the Finder erases its signature-icon database and compiles a new one based on the programs actually on the disk at the time.

Home Work

Q I am a schoolteacher nine years from retirement and have read a great deal about the increasing opportunities to work part-time at home using computers. I own a Mac SE and an ImageWriter II, and I'm pretty experienced with Microsoft Word, Excel, Works, and HyperCard. I have no idea what types of companies need such experience, and I would appreciate advice about whom I might contact for more information.

John A. Betterly
Troy, New York

A Most people who work at home are consultants with specific skills to market—desktop publishing, programming, HyperCard stack development, word processing, graphic arts, and so on. All types and sizes of businesses and government agencies contract with free-lancers for these kinds of work. You get your first clients by putting the word out through friends and acquaintances, advertising in local papers, distributing brochures, showing a portfolio, making cold calls in person or on the phone, or using other methods appropriate to your type of skill. Some user groups keep referral lists to which you can add your name and skills. (To find the user groups near you, call Apple's clearinghouse at 800/538-9696.) Once you get a few clients, finding more is much easier: you have references, and the first clients may refer others to you. Pick one or two types of work you'd like to do with your Mac and start beating the bushes.

Upgrading for Virtual Memory

Q With the impending release of System 7.0, those of us who want to use virtual memory on our Mac Pluses and SEs face critical and costly decisions. Should we upgrade our 68000 CPUs with 030 accelerators from third parties like Dove? Or is the Apple SE/30 upgrade package the best performance-per-dollar route?

Kevin Brekke
New York, New York

A With the earliest prerelease versions of System 7, SEs and Pluses

(continues)

IMPORTANT PEOPLE

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upgraded with PMMU-equipped accelerator boards—boards having a 68030 or 68020 CPU and a 68851 PMMU (Paged Memory Management Unit) chip—were able to use virtual memory. System 7's Memory control panel no longer allows virtual memory to become active on any Macintosh that has a Plus or SE ROM (Outbound users take note). Apple tells me those ROMs do not support the traps (entry points) to several system-software routines that virtual memory needs to access. If it were only the routines that were missing, they presumably could be loaded from disk. But there's no simple way to retrofit missing support for traps. If you need virtual memory and the other features of System 7, an SE/30 upgrade looks like your best bet—that or a used Mac II with a 68881 upgrade.

If all you need is virtual memory, take a look at Virtual from Connectix (415/324-0727). It gives you virtual memory with System 6 on a Mac equipped with a PMMU chip and is bundled with some accelerator boards. Who knows? Maybe Connectix will update Virtual to work with System 7. For more information on upgrade strategies, see "Getting Started with Hardware Upgrades," April 1991.



A CLOCKWORK VERTIGO You can design surrealistic screen-saver images like this with After Dark's MultiModule by creating duplicates of other modules and combining them. Then, by making duplicate MultiModules, you can use Randomizer to alternately display your MultiModule designs.

Shady Table

TIP: To shade a cell in a Microsoft Word 4.0 table, type the following PostScript commands as a separate one-line paragraph at the beginning of the cell:

```
.cell. .75 setgray wp$box fill
```

Be sure to press Return at the end of the line. Then select the whole line and apply PostScript style to it by pressing the Shift key, choosing All Styles from the Format menu, and

(continues)

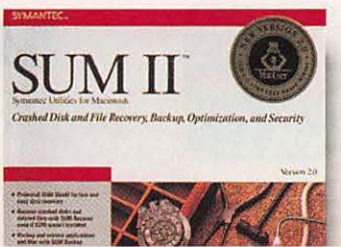


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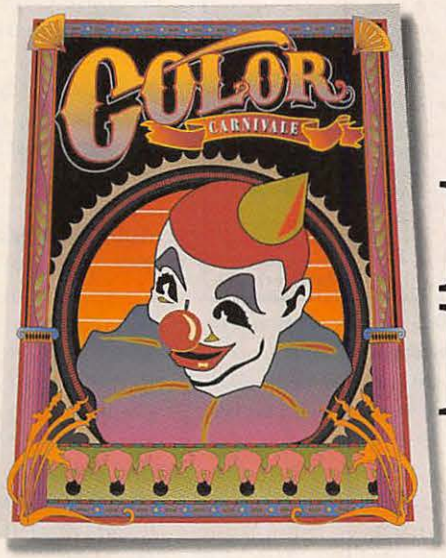
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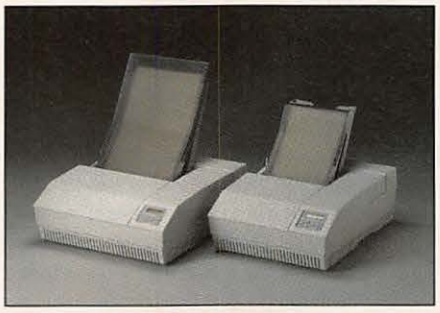
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double-clicking PostScript in the dialog box that appears.

The number .75 determines the darkness of the fill. To make the fill lighter, use a number closer to 1, such as .9. To make the fill darker, use a number closer to 0, such as .5. When you print, make sure the Print Hidden Text option is not selected, or the PostScript commands will print as text instead of having the desired effect.

Alison Moore-Smith
Orem, Utah

To shade a whole row instead of just one cell, replace the word *cell* in the PostScript line above with the word *row*. To get a finer-grained gray, use the following lines of PostScript instead:

```
gsave
.row. currentscreen
/dot exch def
pop
/angle exch def
90 angle {dot} setscreen
.90 setgray wp$box fill
grestore
```

To shade with parallel lines instead of dots, use this bit of PostScript:

```
gsave
.row. 60 45 {pop} setscreen
.90 setgray wp$box fill
grestore
```

The number 45 above sets the angle of the fill lines. Replace it with 90 for horizontal fill lines, 0 for vertical fill lines, or any number in between. You can get wider-spaced fill lines by substituting smaller numbers for the number 60 above. The number .90 determines the thickness of the fill lines. A number closer to zero makes thicker lines.

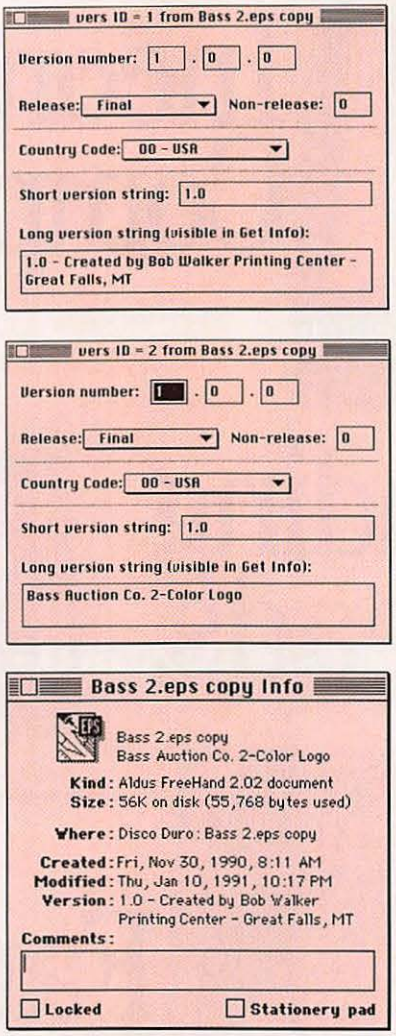
See "Fancy Table Decorations" for examples of the original and the two variations. The inspiration for these variations came from the book, *Learning PostScript: A Visual Approach* by Ross Smith (Peachpit Press, 1990)—L.P.

Random MultiModule

TIP: I recently discovered a way to make the Randomizer module of After Dark [Berkeley Systems, 415/540-5535] alternately display several of my MultiModule screen-saver designs. [MultiModule lets you design combinations of any of the After Dark screen-saver modules and designate one design to display. Randomizer lets you randomly (or sequentially) display any modules you choose, including the currently designated MultiModule design.] Just open the After Dark Files folder in your System Folder, duplicate (⌘-D) MultiModule as many times as you want, and name each duplicate uniquely. Then, in the After Dark section of the Control Panel, designate a different display combination for each MultiModule and select them all in the Randomizer module.

John Willsey
Walnut, California

For more-exotic effects (such as those displayed in "A Clockwork Vertigo,") *Macworld* editor Cathy Abes suggests making several copies of any other module you like. Choose different settings for each copy, and layer any or all of them into your MultiModule design (for best results, make each one transparent). One warning, though: don't delete a design from any MultiModule unless you really don't want it; deleting a design from one MultiModule automatically deletes it from all the others as well.—L.P.



WHO'S RESPONSIBLE By creating two vers resources (top and middle) using ResEdit 2.1 or later, you can add text just below the file name and next to the word *Version* in a file's Get Info window (bottom).

Lock Cracker

TIP: It is possible to unintentionally remove a program or document that has been locked using the Finder's Get Info command (File menu). If you are pressing the Option key while dragging an item to the Trash, you get no warning message that the item is locked.

Naturally, being able to accidentally remove items is dangerous. On the good side, you can use this technique to avoid tediously digging through nested folders looking for locked items and using the Get Info command to unlock each one individually. Instead, simply select the folder that contains the nested items, press Option, and drag it to the Trash. Its entire contents, including all locked items, will be discarded.

Dave Carey and Ken Visser
Notre Dame, Indiana

You can also use the Option key to bypass warnings that normally appear when you drag application programs and System files to the Trash. Be careful!—L.P.

ADB Long Lines

TIP: You can find an ADB cable longer than the standard Apple keyboard cable at your local video accessories store. ADB cables are identical to the new S-Video cables, which are used to interconnect S-VHS VCRs and S-Video TVs. You should be able to find cables 6 feet and longer. Remember, however, that the total length of ADB cable connected to a Mac ADB port should be less than 5 meters (about 16 feet). This will get you away from all that electromagnetic radiation emanating from your monitor.

Fernando Alves
Los Angeles, California

Establishing Credit

TIP: When I create a logo or some other finished work for clients, I like to annotate the file with a credit line. Adding a comment to the file using the Finder's Get Info command isn't permanent enough. Anyone can change or erase the comment, and

(continues)



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comments disappear if someone rebuilds the desktop. Instead I put the credit information in a version resource using ResEdit 2.1 or later as follows (see "Who's Responsible"):

1. Make a copy of the file you want to annotate, and use ResEdit to open the copy. If you get a message asking whether you want to add a resource fork to the file, click OK.

2. Make a new resource of type *vers*. To do that, choose Create New Resource from the Resource menu. In the dialog box that appears, select the vers resource type and click OK. A couple of windows appear. Enter the credit information at the bottom of the active window, whose title begins "vers ID = 128." Change the resource ID number from 128 to 1 using the Get Resource Info command (Resource menu).

3. Repeat Step 2 to create another vers resource. In the space where you entered credit information in Step 2, enter some text that describes the contents of the file. Change the resource ID number from 128 to 2.

4. Quit ResEdit, answering Yes when it asks whether you want to save changes. The text in the vers 1 resource appears next to the label *Version:* in a Finder Get Info window, and the text in the vers 2 resource appears next to the file icon just below the file name.

Bob Walker
Great Falls, Montana

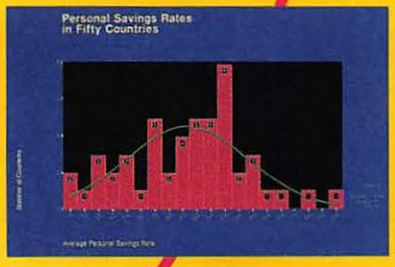
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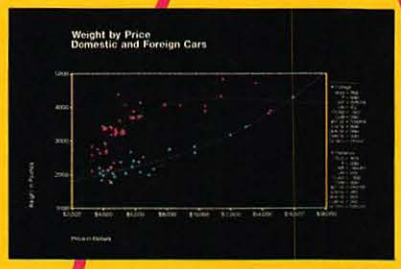
Lon Poole answers readers' questions and selects their tips for this monthly column. You'll find all the best tips from six years of this column in his book Amazing Mac Facts *(Microsoft Press, 1991).*

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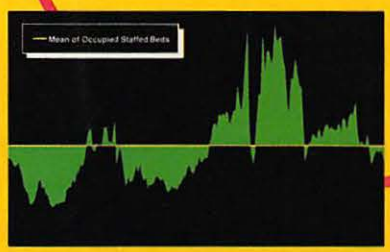




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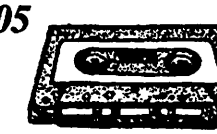
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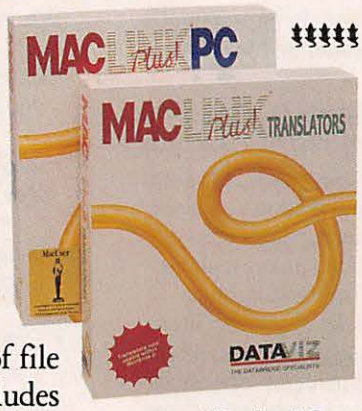


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Getting Started with Multimedia

WHAT IS IT? CAN YOU USE IT? WHAT WILL IT COST?

BY JIM HEID

Multimedia is many things—literally and figuratively. Literally, multimedia is the integration of two or more communications media. It's the use of text and sounds, plus still and moving pictures, to convey ideas, sell products, educate, and/or entertain. It's built around the premise that anything words can do—words, sounds, and pictures can do better. The more, the media.

Some see multimedia as the harbinger of an era when computers will routinely convey information with sound and animation, as well as text images, and when television will become more interactive. But others see it as the victory of sound bites and flashy visuals over the printed word.

Multimedia brims with potential—and the potential for misuse. It can also be technically complex and, in its most advanced forms, quite expensive. This month, I explore the world of multimedia, spotlighting some ways in which it is used, as well as the components that form a complete system.



STEVE LYONS

The Multi Levels of Multimedia

Not long ago, combining sound and visuals—say, jazzing up a slide show with music or narration—was about all there was to multimedia. It didn't require much equipment or technical expertise. You could create title slides and other visuals using a presentation program such as Aldus Persuasion or Microsoft PowerPoint, and then use a stereo cassette deck to record and play the sound track.

Today, multimedia generally means using an *authoring* program such as HyperCard or MacroMind Director to create and playback a production. You can have animation, such as bullet chart items that slide on screen, and *transitions,* such as dissolves and fades between visuals.

A more advanced level of multimedia might use animation sequences that illustrate complex concepts, such as how a steam engine works or how heart valves operate. At this level, your role as producer becomes more demanding. Designing and executing a complex animated sequence requires artistic skills and some knowledge of animation techniques. It also requires software with more advanced animation features than HyperCard's—more about that later.

A sophisticated multimedia production might also incorporate still images captured from a video camera or VCR. A corporate presentation might include shots of a new factory; a medical tutorial might show images captured from a videotape of a surgical operation. For this, you need additional hardware as well as some knowledge of video and lighting techniques.

Then there's sound, which authoring programs support in a few ways. They can play back short sound passages you record directly into the Mac using an add-on such as Farallon Computing's MacRecorder or using the recording circuitry built into the Mac LC and IIsi. So, an animated heart can beat to the sound of a recorded heart, and an animated steam engine can chug as a locomotive

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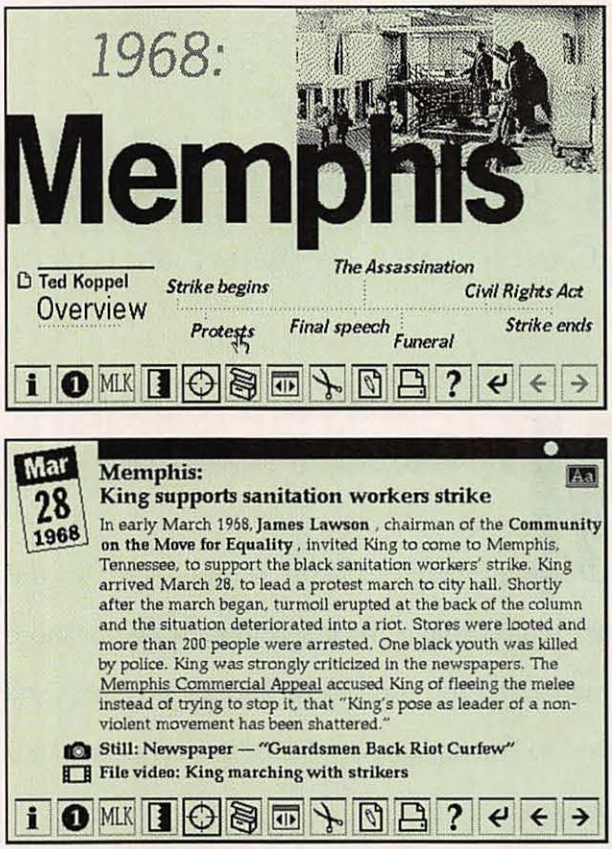
sound plays. Authoring programs can also control electronic synthesizers and CD ROM players, which can store hundreds of megabytes of data as well as CD-quality audio. Thus, a corporate presentation can play to the sound of CD-quality background music, or a music tutorial can display text on the screen while a piece plays.

Passive versus Active

Multimedia productions can be linear affairs—watched from start to finish, like a slide show or a TV program. But the most significant—and exciting—aspect of Mac multimedia is *interactivity*. The most advanced multimedia productions are nonlinear and interactive. Instead of passively watching from beginning to end, you use the Mac to interact with the production, setting your own pace and branching to different topics and areas as they interest you. With interactive multimedia, the Mac and programs like HyperCard become more than devices for presenting various media—they become tools for navigating the media themselves.

The primary tools of multimedia navigation are on-screen buttons and other *hot* areas that, when clicked, take you to other screens, display windows containing additional information, or play sounds—or even video sequences. Interactive multimedia often makes use of yet another piece of hardware, a *videodisc player*, whose discs look like a cross between an LP record and a compact disc.

Videodiscs and interactive multimedia complement each other beautifully, primarily because a videodisc is a *random-access* medium. One side of a videodisc contains 54,000 numbered *frames*, and a player under the Mac's control can skip to any one of them almost instantly. A videodisc player can display frames continuously to show up to 30 minutes of moving footage, or it can freeze on any one frame to show a still. Thus, a multimedia production can include moving and still pictures stored on the same videodisc—along with up to 30 minutes of two-channel audio per side. Those two audio channels can be used for stereo, or they can be used separately to hold, for example, narration in two languages.



INTERACTIVE HISTORY Two cards from the HyperCard stack that controls ABC News Interactive's Martin Luther King Jr. program. Clicking on a topic displays a card containing a timeline (top). Clicking on a subject on the timeline displays a card (bottom) with descriptive text and buttons that display accompanying visuals from the videodisc. Another click displays definitions of any terms, or biographies of any names, that appear in boldface.

Multimedia in Education

Clearly, interactive multimedia has tremendous potential as an educational tool. Nowhere is this better illustrated than in a series of videodisc packages produced by ABC News Interactive and distributed by Optical Data Corporation. In the Martin Luther King Jr. package, you use HyperCard to explore a videodisc brimming with footage of civil rights protests, vintage news reports, and King's speeches, as well as still photographs, maps, and charts (see "Interactive History"). You can watch the entire "I Have a Dream" speech while reading King's prepared text on the Mac's screen—and you can see where, halfway through, he diverged from the prepared text to capture the attention of millions. Other ABC News Interactive presentations include The '88 Vote; In the Holy Land; The Great Quake of '89 (distributed by The Voyager Company); and AIDS.

Each package in the ABC News Interactive series also includes a documentary maker with which students can assemble their own documentaries based on the videodisc's images and news footage. It's this feature that raises a red flag among interactive multimedia critics, who wonder whether students are learning about Martin Luther King Jr. or learning how to produce TV documentaries and splice sound bites.

Another example of interactive instructional media is Warner New Media's Audio Notes series, which uses CD ROM discs and HyperCard to let you listen to and learn about music. One three-disc package presents Mozart's opera *The Magic Flute;* a one-disc package called The String Quartet: The Essence of Music presents a Beethoven string quartet. As the latter plays, you can use an accompanying HyperCard stack to view any of several measure-by-measure commentaries on the music, each assuming different levels of musical knowledge (see "Listen and Learn"). Other parts of the stack contain graphical data on Beethoven and other tutorials on music theory.

Optical Data Corporation produces complete packages that teachers can use as is or as tool kits for

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"I use a lot of programs on my personal computer, and I copy them all the time."

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"Oh, come on. I bought it: I have a right to copy it."

"You *do* have a right to make a back-up, that's true. But when you start copying programs for your friends and co-workers, that's breaking the law."

"What law? Any copying I do is in the privacy of my own home."

"It doesn't make any difference where you do it. Every time you copy a program without permission from the publisher, you're committing a federal offense."

"That's all right, I won't get caught."

"You're missing the point. The issue isn't "What can I get away with?"—it's "who am I hurting?"

Remember, lots of people worked hard to produce every program you use: designers, programmers, distributors, retailers, not to mention all the people who support users. They have a *right* to be compensated for their efforts, and their major compensation is through software sales."

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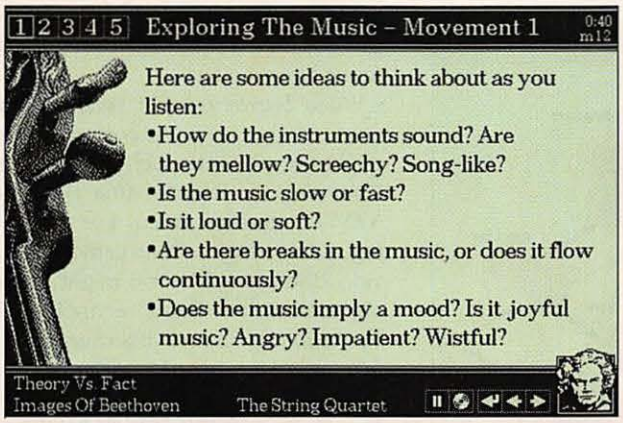
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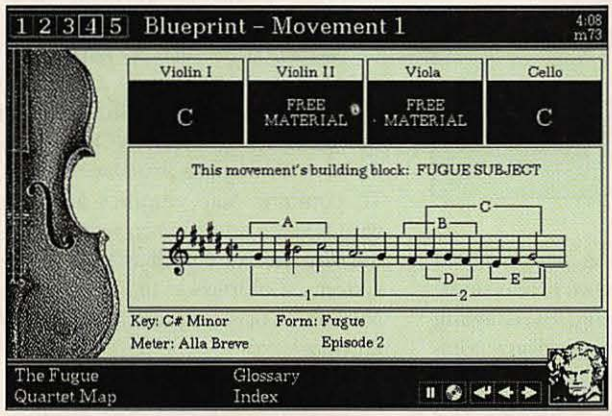
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LISTEN AND LEARN Warner New Media's The String Quartet lets you listen to a digitally recorded Beethoven string quartet playing on a CD ROM drive while you read on-screen text in any of several knowledge levels. Level 1 (top) is for listeners with the least musical knowledge; level 4 (bottom) analyzes the structure of the currently playing segment. In the upper-right corner, a counter displays elapsed time as the music plays.

creating their own instructional materials. The Planetscapes package, for example, contains a videodisc laden with images of planets taken by the Voyager spacecraft, of North America taken by Landsat satellites, and of space shuttle missions and components. Accompanying stacks let you browse the Voyager images, view Landsat images by clicking on a map, and learn about the space shuttle. You can also create your own stacks that use the videodisc images.

To give educators a hands-on overview of interactive multimedia's potential—and to allow them to create their own multimedia materials—researchers at Apple's Multimedia Lab spent two years developing a package called The Visual Almanac. It comprises a CD ROM containing 25MB of HyperCard stacks and digital audio; a workbook; and a videodisc with 7500 sounds and moving and still images. The HyperCard stacks include 14 student activities in science, the arts, social studies, and mathematics. There's also a composition work space that lets you search for images and sounds based on keywords you type, and then assemble them into stacks. The Visual Almanac is available for the remarkably low price of $100 from Optical Data Corporation.

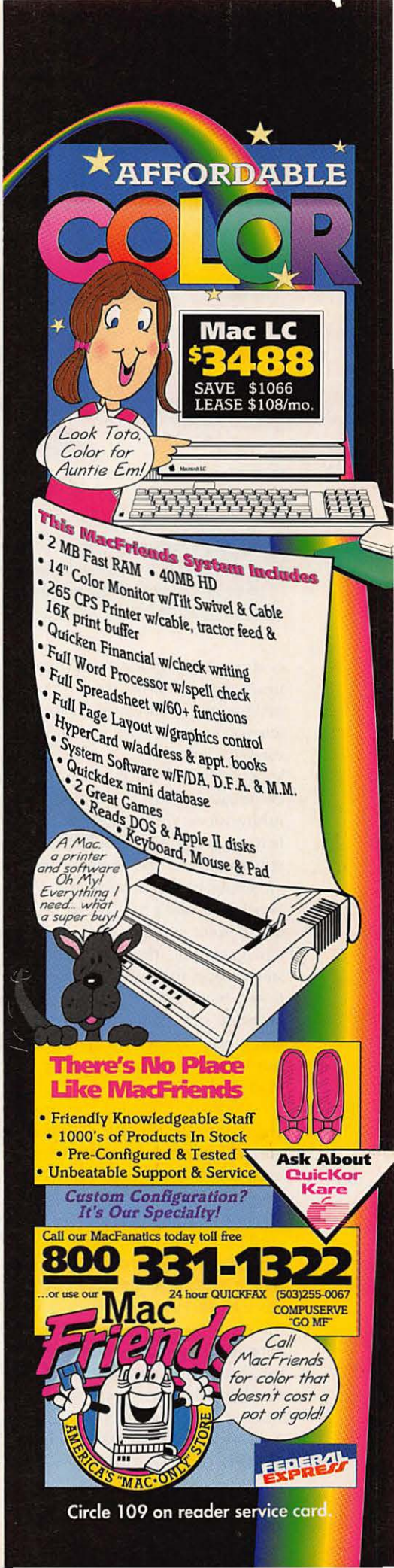
Of course, interactive multimedia has applications beyond the classroom. Interactive information kiosks in airports, at shopping malls, or on trade show floors can provide directories and profiles of cities, stores, or exhibitors. Interactive presentations can spotlight a concept, company, or product in an engaging way. Interactive museum exhibits can enliven any subject. In San Francisco's Exploratorium, you can "fly" over the Bay Area, viewing aerial footage and setting your own course using a trackball.

Examining the Pieces

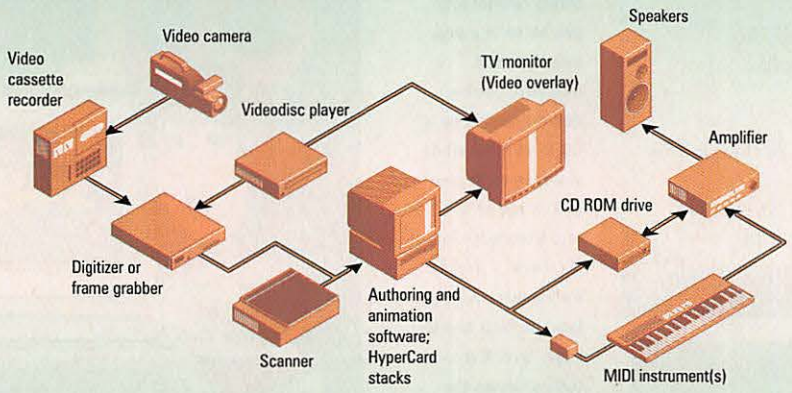
Here's a closer look at the software and hardware components involved in multimedia ("Multimedia to the Max" illustrates how they interrelate) and a partial list of products from each category.

▪ *Authoring* This key software lets you direct a production's cast of audio and visual characters. HyperCard

(continues)



Multimedia to the Max



A complete multimedia setup might use these components: a video camera or recorder and digitizer or frame grabber for incorporating graphics; a videodisc player for showing still and moving images; and a CD ROM drive and MIDI synthesizer for high-quality audio.

is the most popular authoring program; its relatively-easy-to-learn programming language, HyperTalk, lets you create simple animations and establish links between on-screen hot spots and other cards. HyperCard users might want to try Motion Works' Addmotion, which adds animation features to HyperCard 2.0, enabling you to author and animate without switching between programs. Silicon Beach Software's SuperCard provides better color support than HyperCard and gives you the ability to create stand-alone applications, people who don't have SuperCard. Spinnaker Software's Plus offers similar features and is also available for IBM PCs. You can move Plus productions between Macs and PCs.

More-specialized authoring programs include Farallon Computing's MediaTracks, MacroMind Director, and Authorware's Authorware Professional. MediaTracks lets you produce Macintosh training materials by recording screen activity and then adding graphics, digitized sounds, and on-screen navigation buttons. Director 2.0 has a HyperTalk-like language, Lingo, for creating interactive animations containing navigation buttons; Director also includes a player application that lets others use your productions without their having to own Director. Authorware Professional is a high-end ($8050) package that provides sophisticated animation features and lets you create interactive productions, without programming, by drawing links between the production's components. Authorware also provides training, customizing, and production services for its clients.

- *Animation programs* In addition to Director and Authorware, there's Bright Star Technology's interFACE, which lets you create *agents*—talking heads whose mouths move and facial expressions change as digitized speech comes from the Mac's speaker. Agents can guide users through a production or act as on-screen teachers. They can be used with HyperCard, Director, and other programs that support HyperCard external commands (XCMDs).

Electronic Arts' Studio/1 is a monochrome paint program that lets you create simple black-and-white animations that you can play back within HyperCard and other authoring programs. Three-dimensional animations made with 3-D drawing packages such as Silicon Beach's Super 3D and Paracomp's Swivel 3D Professional can also be played back within authoring programs. For more advanced animations with special effects, you can use Linker Systems' The Animation Stand. It can also produce broadcast-quality video animations in conjunction with high-end animation hardware such as Diaquest's DQ-Animaq, a Mac II board that controls professional video recorders on a frame-by-frame basis.

- *Video hardware* For recording a presentation on videotape, you might use a board—such as one from RasterOps or Radius—that outputs *NTSC-compatible* video. For capturing video images from camcorders, videodiscs, or VCRs, you might use a *digitizer* such as Koala Technologies' MacVision. For faster digitizing, use a *frame-grabber* board such as RasterOps' FrameGrabber 324NC, Orange Micro's Personal Vision, or Workstation Technologies' WTI-Moonraker.

With boards such as Aaps' DigiVideo, Computer Friends' ColorSnap 32+, and Radius's RadiusTV, you can display video from VCRs, videodiscs, or TV stations in a Mac window. To combine Mac graphics and text with a video source, you need *video-overlay* hardware such as Mass Microsystems' ColorSpace IIi, Truevision's NuVista+, or Computer Friends' TV Producer Pro.

Then there are VCRs and videodisc players. NEC Technologies' PC-VCR is an S-VHS VCR you can attach to the Mac and control much like a videodisc player. VHS videocassettes cost far less to produce in small quantities than videodiscs, so a PC-VCR could be an economical alternative if you produce your own video materials. But a videocassette isn't a random-access medium; it can take as long as 2½ minutes to locate a given point on the tape. As for videodisc players, Pioneer and Sony make the largest assortment with RS-232C serial interfaces that connect to the Mac.

- *Audio* To record and play back CD-quality audio, you need Digidesign's Audiomedia board. Throw in a big, fast hard drive, too, because CD-quality stereo requires 20MB of disk space per minute. As an alternative, use a MIDI interface to connect a Mac to one or more MIDI synthesizers and play back MIDI *sequence* files, which use a small fraction of the space. Passport Designs' Music Data company sells hundreds of prerecorded MIDI sequences (MIDI Records and MIDI Hits). You might also consider Digidesign's MacProteus board, a version of E-mu

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But Can You Afford It?

Going for broke in interactive multimedia can mean going broke. Indeed, until the prices come down—or until there is a new generation of TVs that incorporate some of the pieces—full-blown interactive multimedia will remain primarily confined to corporations and educational institutions.

But the larger issue is the impact interactive multimedia will have on education. Will the ability to create, in essence, their own documentaries give students a better grasp of current events? Or will their technological wizardry merely distract them from deeper analysis or even distort their views of those events? What about events that took place before the inventions of sound recording and photography? And what about disciplines that don't benefit from computer graphics and old newsclips, such as literature? Can students really concentrate in an expository writing class if they're eagerly anticipating zooming around the Solar System in their next period? After a few years of nonlinear, TV-based education, will they be able to concentrate at all?

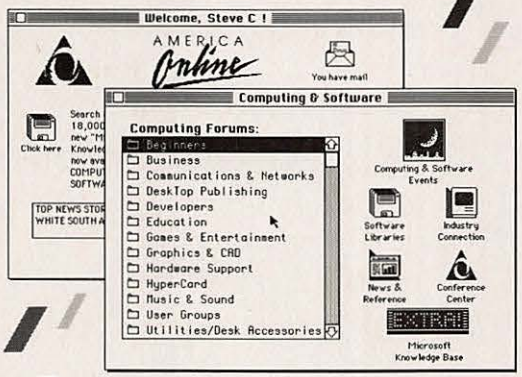
Educators and curriculum planners who seek the answers to those questions—and to brace themselves for the consequences—should definitely be in on the ground floor of interactive multimedia. Not only will they need to prepare for what appear to be tomorrow's teaching techniques, but also to shape those techniques into being more than technological diversions. Instead of asking, as some media critics have, How can we use television and the computer to shape the form and content of education? they should be asking, How can we use education to shape the form and content of television and the computer? M

See *Where to Buy* for contact information.

Jim Heid is a contributing editor of Macworld. *His latest book is* Macworld's Complete Mac Handbook *(IDG Books Worldwide, 1991).*

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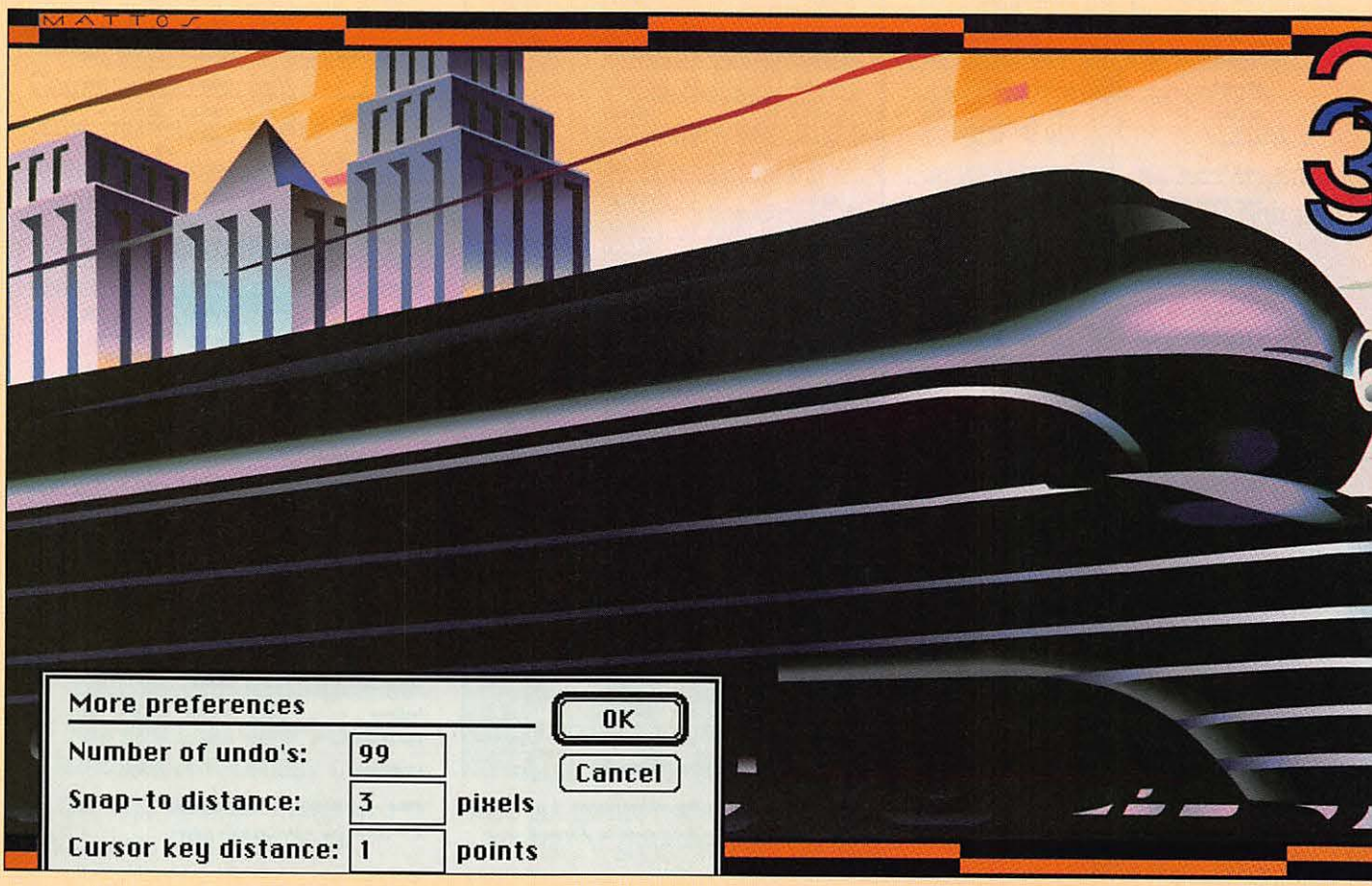
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Insights on PixelPaint Professional

ART LESSONS FOR PIXELPAINT PROFESSIONALS (AND AMATEURS)

BY ERFERT FENTON

SuperMac's PixelPaint has progressed to the point where it feels more like paint than pixels. The original PixelPaint was a well-crafted 8-bit paint program that offered digital analogs of artists' tools such as brushes and pens. PixelPaint Professional 1.0 added amenities such as masking, antialiasing, spline curves, and transparency adjustment—plus 16 million colors. PixelPaint Professional 2.0 (due to ship in late March) comes even closer to simulating real-world painting.

The following tips apply to PixelPaint Professional versions 1.0 and 1.01, except for the PixelPaper tip, which applies to 2.0. Although you can use PixelPaint Professional with an 8-bit board, most of these tips require the program to be running in 24-bit mode. I'd like to thank Claire Barry, Tim Gray, and Bill Leasure at SuperMac for their help, as well as artists David Burwinkel and Mark Weissman.



Missing Pieces **was created by artist Mark Weissman using digitized family photographs and PixelPaint Pro.**

Smooth That Text

If you've ever typed text in PixelPaint Pro, you've probably noticed that characters look better on screen when the program's antialiasing feature—which smooths jagged edges by adding pixels of intermediate colors—is turned on. (You can tell antialiasing is turned on when the boxed diagonal line in the lower left-hand corner of the palette is smooth instead of jagged.) What you might not realize, however, is that you can take advantage of scalable PostScript fonts to create good-looking text at virtually any size, even though PixelPaint Pro is a bitmapped paint program, not a PostScript draw program. How? Adobe Type Manager uses information in a PostScript font's printer font file to scale text on screen; install ATM and the appropriate screen and printer fonts, and you won't have to rely on the limited number of sizes offered by screen fonts. Use ATM's scaling in conjunction with PixelPaint Pro's antialiasing to create beautiful text for slides or printed artwork. (Note: ATM works only with Type 1 PostScript fonts, a technology formerly the exclusive domain of Adobe and its licensees. If you're willing to spend a bit more on utilities, you can use Altsys's Metamorphosis or Image Club's Evolution to convert Type 3 fonts to Type 1 format.)

Neon Text

PixelPaint Pro lets you create shapes that glow like neon. Here is a way to add that neon shimmer to typed text.

1. Open a new document and set the background color to black.
2. Make sure that antialiasing is selected.
3. Double-click on the eraser tool to fill the background with black.
4. Select the foreground color.
5. Click on the text tool, and select a font and size from the Text menu; for best results use a font size of at least 200 points. Type a word or phrase. (Remember, with ATM and a PostScript printer font installed, you can create smooth text at large sizes.) Since PixelPaint Pro doesn't offer kerning, you use the lasso tool to adjust letterspacing.
6. Choose a blend color that's the same hue as, but lighter than, the foreground color.
7. Select Fill Effects from the Options menu, and configure the options as follows: Method: Shapeburst; Style: Standard; Using: True Colors; Speed: Constant; Respect To: Object. Leave the other settings as they are.
8. Hold down the ⌘ key and select the first letter by clicking on it with the lasso.
9. From the Effects menu, select Apply Fill Effect. The letter will fill with

(continues)



FLUORESCENT PAINT Use a combination of PixelPaint Pro's Fill effect and airbrush tool to add a neon glow to any font.

a blend that's lighter in the center, giving it a glowing look. Repeat the procedure for each letter.

10. If you wish, select a foreground color that's a lighter version of the blend color and use the airbrush tool (with the Centered option selected) to trace and enhance the glow in the center of each letter. For best results, use a relatively small airbrush tip (10 or so, depending on font size). Choose the Polygon option from the Airbrush menu, and follow the glow in the center of each letter.

11. Surround the entire word or phrase with the marquee tool, and apply Smoothing from the Effects menu to simulate the out-of-focus appearance of real neon tubes. The more times you apply smoothing, the fuzzier the letters become (see "Fluorescent Paint").

Make Your Own Paper

Many a traditional artist knows the joy of applying watercolor paint, charcoal, or chalk to a piece of paper and seeing the texture of the paper show through. With PixelPaint Professional 2.0, you can approximate the look and feel of textured paper. The program comes with four varieties of PixelPaper, and you can make your own by following these steps:

1. If you have access to a scanner, scan a piece of paper or cloth that has a visible pattern or texture. Save the file. Paste the scanned image into PixelPaint Pro's Paint layer.

If you don't have a scanner, you can use PixelPaint Pro's painting tools to make a pattern in the Paint layer. Experiment with effects like Emboss, Sprinkle, or Diffuse to make your pattern more paperlike.

2. Place the pointer on the Mask button and choose Mask Only from the pop-up menu that appears.

3. Choose Copy Luminance to Mask from the Mask menu.

4. Place the pointer on the Mask button again and select Paint Only from the pop-up menu to return to the Paint layer. Double-click on the eraser tool to erase the original scanned image, leaving only the mask.

5. You can return to the Mask Only layer and edit the texture of the paper with PixelPaint Pro's brightness and contrast controls via the Edit menu.

To make the texture appear, press the Mask button and select Use Mask. Then use the paper with tools such as the charcoal, airbrush, or paintbrush (see "Custom PixelPaper").

Text on a Background

If you plan to place text over an object that has been filled with a blend of colors using the Fill command, make sure you fill the object first, before typing the text. If you type the text first and then fill the object, the open portions of letters such as *o* and *e* appear in the selected background color rather than picking up the blended fill.

Airbrush Adjustment

Rather than periodically adjusting the airbrush tool's flow in PixelPaint Pro's Airbrush Properties dialog box, you might find it quicker to simply slide the Transparency Selector bar back and forth as you use the airbrush. If you frequently adjust the tool's flow rate, you'll find that this technique saves you many a trip to the Airbrush Properties box.



CUSTOM PIXELPAPER PixelPaint Professional 2.0's masking feature enables you to create custom "paper" that simulates the texture of the real thing.

Picky Paint

If you combine scanned photos in PixelPaint Pro, you'll notice a stark outline when you paste one scanned image on top of another. A little antialiasing is in order here to blur the outline and make the image appear more photolike. But many PixelPaint artists find that both the water drop and finger tools blur the edges too much, even when set to a small size. If you are the patient sort, you can antialias an object by hand. Two methods are described here. In the first technique, you alternate between the pencil tool and the dropper tool to place transparent versions of colors on either side of the sharp border between the two objects, thus softening the border.

1. Paste one scanned image on top of another.

2. Slide the Transparency Selector bar almost all the way to the left, so that it is set for around 94 or 95 percent transparency.

3. Zoom in twice so you can easily work pixel by pixel. Move to a position on the sharp boundary between the pasted image and the background image.

4. Select the dropper tool. Work right along the border where the pasted foreground image meets the background image. From the background image, select a color that adjoins the pasted image's ragged edge.

5. Select the pencil tool (pressing the period key is a tool-selection shortcut). Click just inside the pasted object's border. The transparent color you picked up from the background blends with the color you click on, softening the edge between the two objects.

6. Press ⌘-tilde (~) to toggle to the dropper, and repeat the procedure as necessary along the objects' border. You'll get subtle blending that would be impossible to achieve using the standard tools.

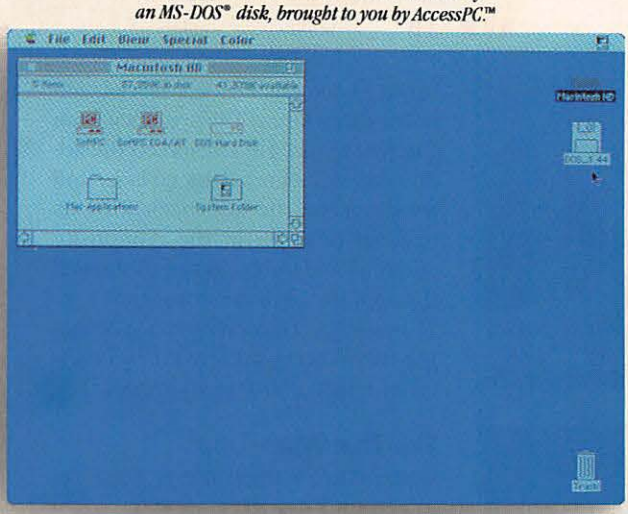
If the preceding method is too tedious for you, try the following trick, which is easier but offers somewhat less control.

1. As in the previous tip, zoom in on the border between two images.

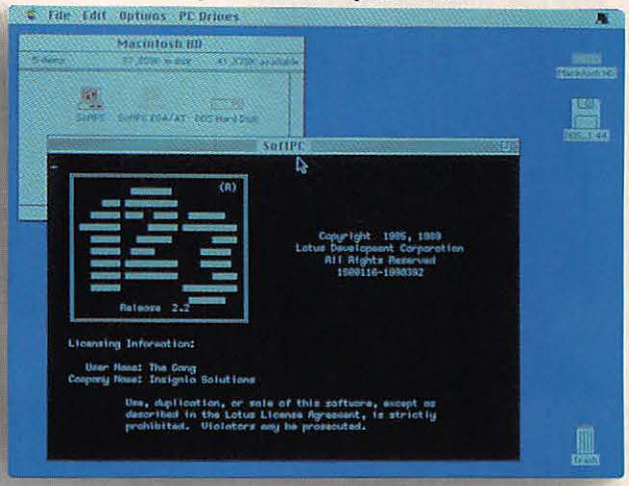
2. Select the lasso tool, and choose Polygon from the Lasso menu.

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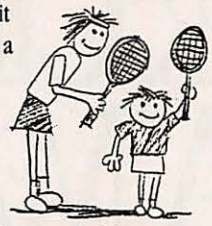
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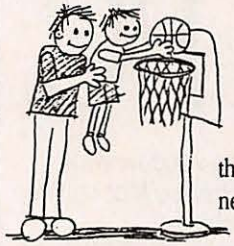
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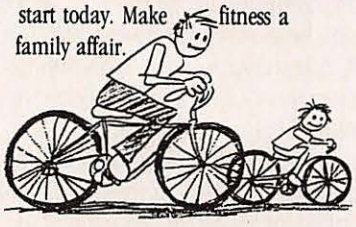
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TRANSIMAGE TRANSPARENCY **PixelPaint Pro's Copy Using Transparency command lets you overlay transparent images in digitized photo collages and other types of paintings.**

3. Lasso an area that contains the borderline and a pixel or two on each side of it.

4. Apply the Smooth effect from the Effects menu. Voilà! Precision antialiasing.

A Veil of Transparency

When he was creating his painting *Missing Pieces* from a batch of digitized family photos, artist Mark Weissman wanted the image of his mother's bridal veil to overlap another photo to help tie the images together (see the painting on the first page of this article). To do so, he lassoed the veil in the digitized wedding shot and moved it to a blank part of the document, where he touched it up a bit. He then set the Transparency Selector to 15 percent, lassoed the veil, and chose Copy Using Transparency from the Edit menu. He assembled the additional elements of the collage, and then pasted the veil back into its original position in the composite painting, and the background showed through the semitransparent veil (see "Transimage Transparency"). You can use this effect to achieve different levels of transparency in an image.

The Thin White Line

If you paste a PixelPaint Professional image into a presentation program like Microsoft PowerPoint or Aldus Persuasion, you might get an unpleasant surprise when you have slides made. Although the image looks fine on screen, an unsightly white border sometimes appears around objects when you have a slide made using a film recorder. To abolish that outline, use a background color in PixelPaint Pro that closely matches the background color you'll be using in the presentation program. Then lasso the image (use the lasso's Autoslip option if the background has more than one color) and paste it into the presentation application.

One Sick Trick

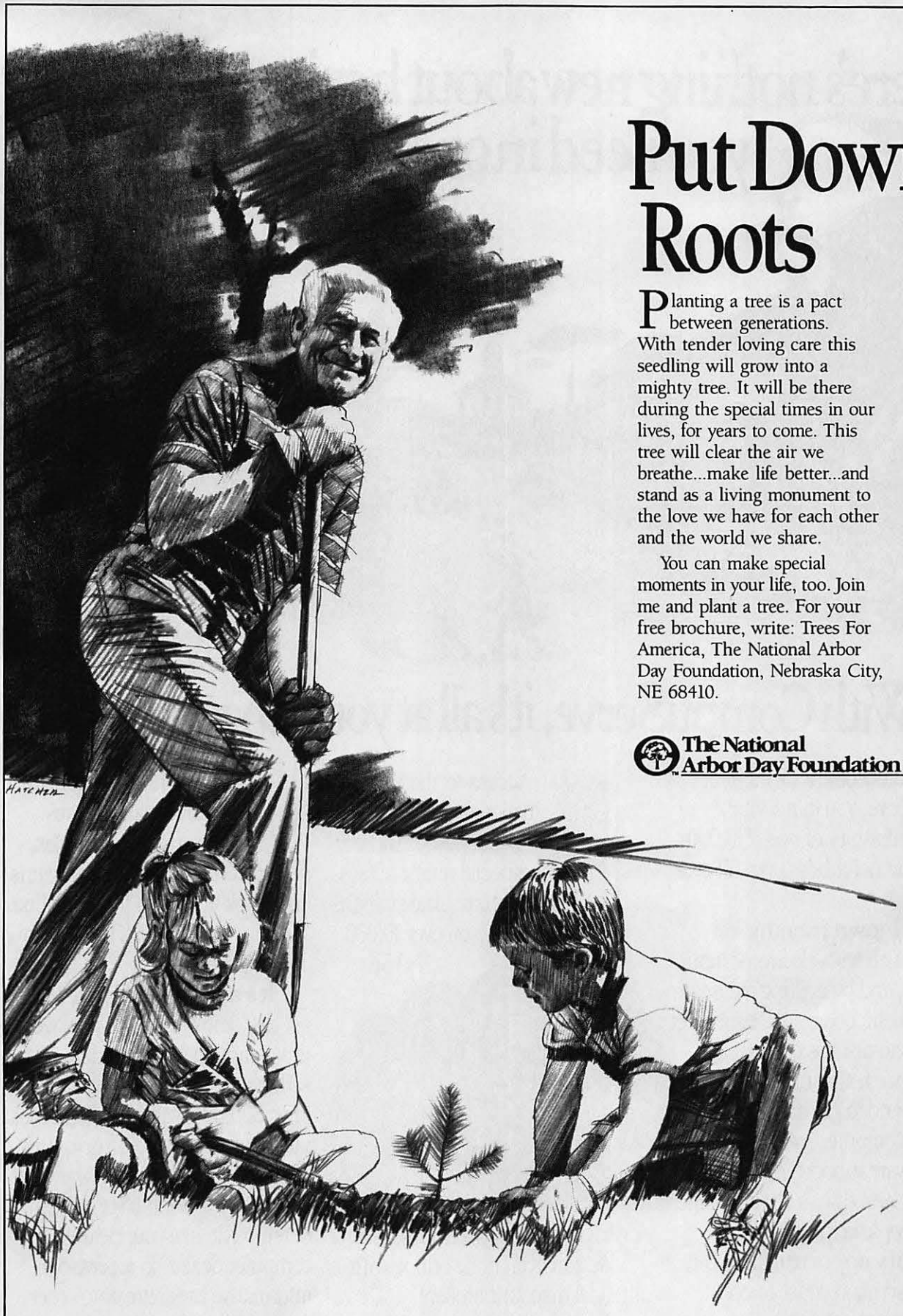
Stroll up to a cohort who has a PixelPaint Pro 1.01 document on screen. Say something to the effect of, "Hmm, your Mac feels a little warm to me." Then surreptitiously press the colon key, and watch the fun begin (or watch your cohort writhe in abject horror, depending on his or her temperament). Press the mouse button to return to normalcy. (Warning: Kids, don't try this trick on anyone who doesn't have a good sense of humor.)

Sharing the Wealth

If you've found a tip or shortcut not mentioned here, spread the word to other *Macworld* readers by sending it to *Quick Tips, Macworld,* 501 Second St., San Francisco, CA 94107. M

See *Where to Buy* for contact information.

Erfert Fenton is actually a bug-eyed alien from another galaxy, but is currently masquerading as a Macworld *contributing editor.*



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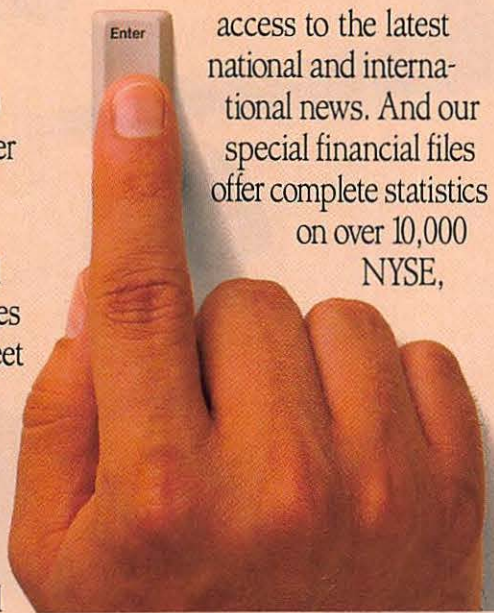


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UPDATES

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Aldus FreeHand 3.0 includes features for on-screen palettes that list the line and fill colors, graphic styles, and layers that can be used in producing illustrations. Has improved text controls that enable you to convert characters to editable outlines, automatically position text around the top and bottom of an ellipse, and create vertical text; gives users the choice of working in preview or keyline mode; and includes a color separator that produces full process-color separations for all parts of an illustration. Aldus, 206/628-6674. Contact vendor for update price; $495 new.

Microsoft Excel 3.0 integrates outlining to enable users to collapse or expand large or complex worksheets to view them at different levels of detail. Has a consolidate feature that lets users combine and summarize worksheets in memory or on disk, regardless of the worksheets' structure or format. Microsoft, 206/882-8080. Contact vendor for update price; $495 new.

StuffIt Deluxe 2.0 runs faster than the previous version, has the ability to create self-unstuffing archives, contains a Save as command, and includes text and MacPaint optimizers. Aladdin Systems, 408/685-9175. Free; $99.95. M

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1st Aid Kit ★	2.8	512KE/3.0		*
4th Dimension	2.1	1MB/6.0.2		Free
Aatrix CheckWriter II ★	2.01	512K/4.1		$10
Aatrix TimeCard	2.0	512K/4.2		Free
Accountant Inc., Professional	1.0.4	1MB/6.0.3	9/90	$19.95
ACCPAC Bedford Simply Accounting	1.1	1MB/5.1		$50
AccuText	2.0	4MB/6.0.2		*
Address Book	2.0	1MB/6.0.2	6/90	$25
Adobe Illustrator	3.0	2MB/6.0.3	2/91	*
Adobe Type Manager ★	2.0	1MB/6.0.2		Free
AdWriter	2.0	1MB/6.0		Free
After Dark	2.0	512KE/4.1	5/91	*
AgfaType	2.0	2MB/6.0.2		Free
Alchemy	1.1	1MB/6.0	10/90	$25
Aldus FreeHand	3.0	1MB/6.0.3		*
Aldus PageMaker	4.0	1MB/4.1	9/90	$150
Aldus Persuasion	2.0	1MB/6.0		*
AmPack Plus ★	4.2.2	512K/3.2		$29.95
Analog Connection WorkBench	3.0	1MB/5.0		$50
AntiToxin	1.3	1MB/6.0.2		$15
Aperture	1.7	2MB/6.0.3	7/90	*
AppleShare File Server	2.0	512K/3.2		*
ArchiText	2.0	1MB/6.0.2		Free
Aristotle's Politics	2.0	2MB/6.0.3		Free
The Art Importer	2.0	1MB/6.0		$20
ArtRoom	3.0	512K/3.2		$199
Ashlar Vellum	**2.0**	**4MB/6.0.2**	**6/90**	**$95**
AutoCalc	2.0	1MB/6.0		$95
AutoSave II	2.0	512KE/4.2	7/90	*
A/UX	2.0	4MB/6.0.5		*
BackFax	1.5	1MB/6.0.3	7/90	$7.50
BackMatic	**2.0**	**1MB/4.2**		*
Back to Basics: Professional	2.0	512K/3.2		$75
Bitstream Typeface Library	2.0	1MB/6.0		*
Blueprint	2.0	1MB/6.0		*
Bomber	2.0	1MB/6.0		*
Bridge	6.0	512K/3.2		$17
Business FileVision ★	1.5	1MB/6.0.2		*
Business Sense ★	1.2	1MB/6.0		*
Business Session ★	3.2	512K/3.2		Free
CA-Cricket Presents	2.0.1	1MB/6.0		*
Calculator Construction Set ★	2.06	512K/3.2		$25
CanOpener	1.1	512K/3.0		Free
Canvas	2.1	1MB/6.0		*
Capture	4.0	1MB/6.0		$30
Central System Manager	2.1	1MB/5.0X		*
Chameleon	3.0	512K/3.2		Free
Chemintosh II		1MB/6.0.2		Free
ChromaScan	2.0	6MB/6.0.5		*
Claris CAD	2.0	2MB/6.0		$79
Codecheck	2.0	1MB/6.0		Free
Colorset ★	1.5	1MB/6.0	6/90	Free
CompileIt	1.5	1MB/6.0.2		$30
CompuServe Navigator	3.0	512K/3.2	12/90	*
ConcertWare	5.1	512KE/4.2		$35
Control II	1.1	2MB/6.0.4		Free
CopyFlow	2.0	2MB/6.0	6/90	Free
Correct Grammar	2.0	1MB/4.2	9/90	$29.95
Crystal Ball	2.0	512/4.2		$75
Cue	3.0	1MB/6.0.3		*
DacEasy Light Checkbook Accounting	2.0	1MB/6.0.3		*
Data Desk	3.0	512K/4.0.2	6/90	$125
DataMerge	2.0	512K/3.2		Free
dBase Mac ★	1.01	1MB/4.1		Free
Deluxe Music Construction Set	2.5	512K/6.0.2		*
DesignStudio	**2.0**	**1MB/6.0**		*
DeskPaint ★	3.0	1MB/4.2		Free
Developer Stack	3.0	1MB/6.0		$15
DiagramMaker	2.0	1MB/6.0.2		$35
Digital Darkroom	3.0	1MB/6.0		*
DiskDoubler	3.0	1MB/6.0.2	12/90	Free
DiskExpress II	2.04	1MB/6.0	11/90	*
DiskFit and Network DiskFit	2.0	1MB/6.0		*
DiskTop	4.0	1MB/6.0	7/90	*
Display AdBuilder	1.1	1MB/6.0.3		*
DocuComp	1.5	512K/3.0	12/90	$19.95
Dollars and Sense	4.1	512KE/3.2		*
Double Helix	3.5	1MB/6.0		*
DragonWave	2.0	1MB/6.0.3		Free
Dreams	1.1	1MB/6.0.2		*
DynaPerspective	2.0	2MB/6.0.4		Free
DynoDex ★	1.21	1MB/6.0	6/90	Free
Easy Color Paint	2.0	1MB/6.0.2	9/90	*
Empower II ★	3.03	1MB/4.2		Free
EndLink	1.1	512K/3.2		Free
EndNote Plus		512KE/3.2		$49
Exodus	2.0	1MB/6.0		$50
Extender GrafPak	3.0	1MB/6.0.2		$30
Falcon ★	2.2.1	1MB/3.2		$3
Fastback II	2.1	512KE/4.1		$30
Fast Forms	2.0	1MB/6.0	11/90	$25
FastLabel	2.0	1MB/6.0		$36
FastTrack	1.5	512KE/5.5		$20
FaxGate	1.1	1MB/6.0		Free
Ferrari Grand Prix ★	1.6	512K/3.2		$10
FetchIt	2.0	512K/6.0.1		*
FileMaker Pro	1.0	1MB/4.2	2/91	*
Filevision IV	1.1	1MB/4.2		$15
FilmMaker	2.0	5MB/6.0.3	3/91	*
Finale	2.6	1MB/6.0.2		Free
Financial Analysis	3.0	512K/3.0		*
Findswell	2.01	512KE/3.2		*
Fontographer	3.1	1MB/4.2		*
FontShare	2.0	1MB/6.0		Free
FormsProgrammer ★	2.03	1MB/6.0.2		$15

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Bold *= first time the product is being listed.*

★ *= minor update.*

Req. *= min. RAM and system software required.*

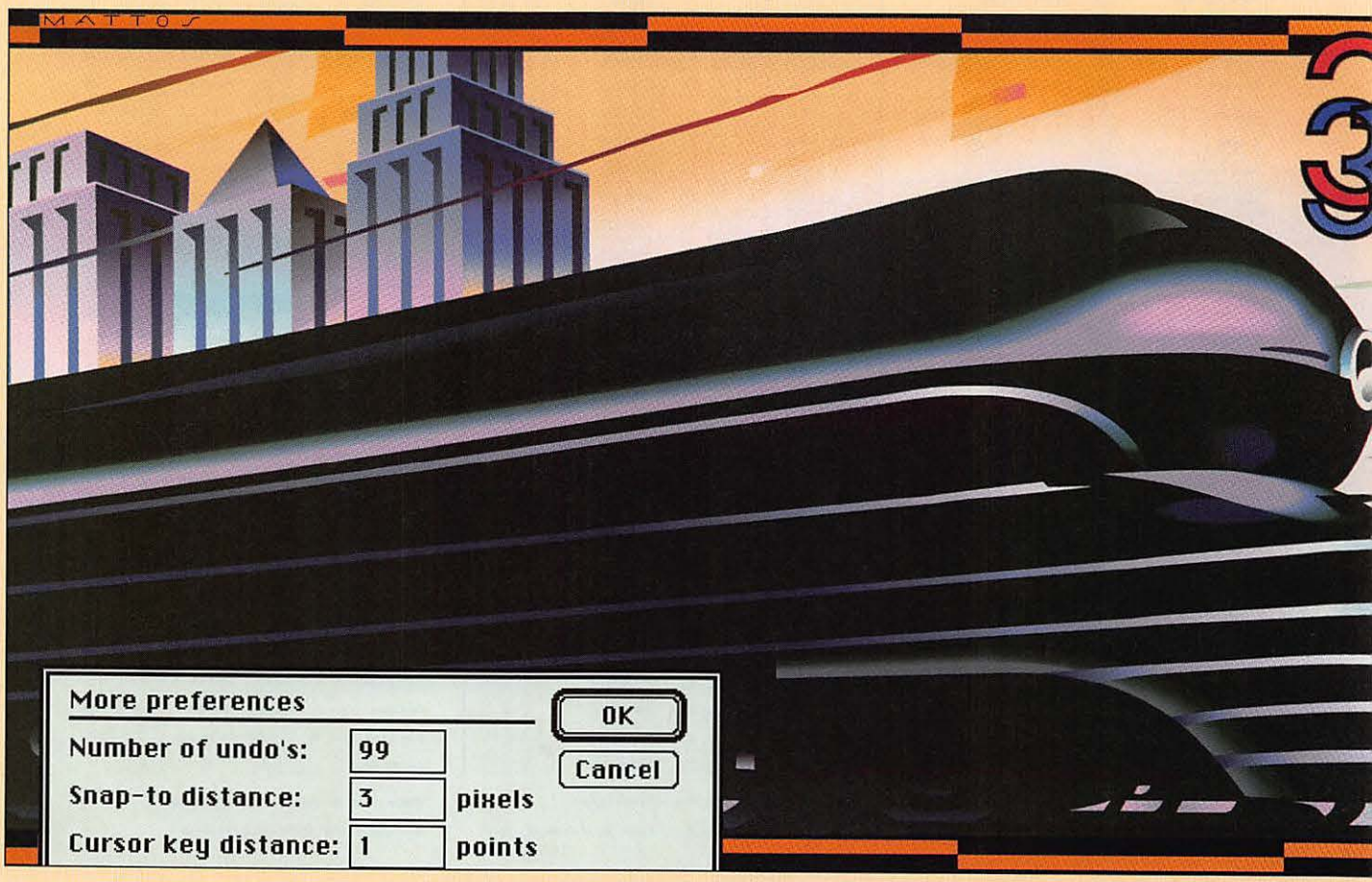
Rev. *= last time (in past year) reviewed this or an earlier version.*

Price *= cost for update to registered owners.*

* *= contact your dealer for update policy.*

PRODUCT UPDATES

Product	V.	Req.	Rev.	Price
FountainView	3.0	1MB/6.0		$15
FoxBase+/Mac ★	2.10	1MB/6.0		$75
Freedom of Press ★	2.2	1MB/6.0		Free
FreeFlow	3.0	1MB/6.0.3		Free
Full Impact ★	2.0	1MB/6.0		$50
FullWrite Professional	1.5	2MB/6.0.2		*
Gamblin' Times	3.0	1MB/6.0	3/91	$10
GeoQuery	2.0	1MB/6.0	10/90	*
Gofer	2.0	1MB/4.1		$25
GQL	2.0	1MB/5.0		*
Grammatik Mac	2.0	1MB/5.0	9/90	Free
Great Gantt	1.3	1MB/6.0	12/90	Free
Great Plains Accounting Series	5.35	1MB/6.0		*
HandOff II	1.1	1MB/6.0.2		Free
Handwriting Analyst ★	3.1	512K/3.2		$24.95
Hard Disk Util	3.0	1MB/6.0		$65
Help DA	3.0	1MB/6.0		Free
HFS Backup	3.0	512K/3.2		$35
HydroMac	2.0	1MB/6.0		*
HyperAnimator ★	1.5	1MB/6.0.3		$29.95
HyperCard	2.0	1MB/6.0.3		$49
HyperDA ★	1.2	512K/3.2		$10
HyperEngine Developer's Tool	2.0	1MB/6.0.3		$25
HyperLibrary	2.0	1MB/5.0		*
HyperTools	2.0	2MB/6.0.2		$20
HyperWindows ★	1.2	1MB/6.0.2		$20
Icon-It	2.0	1MB/6.0.2	9/90	$29
if:X Forms Designer	1.1	1MB/6.0	9/90	Free
ImageStudio	1.5	1MB/6.0		$99
ImageWriter LQ Print Driver ★	2.0	512K/3.2		Free
In-CAD	2.0	2MB/6.0		*
InfoLogic Envelope ★	1.1c	512KE/4.0		$5
Insight Expert Accounts Payable	2.2	1MB/6.0		*
Insight Expert Accounts Receivable	2.2	1MB/6.0.2		*
Insight Expert General Ledger	2.2	1MB/4.2		$99
Inspiration	3.0	1MB/4.2	11/90	*
Instant-Expert Plus	3.0	1MB/5.0		Free
JetLink Express	2.0	1MB/6.0		$30
KidsTime ★	1.2	512K/3.2		$15
KiwiEnvelopes	3.0	512KE/4.1		$10
LanguageSystems Fortran ★	2.1	2MB/6.0.4		Free
LapLink Mac III	3.0	512K/2.0	7/90	*
LaserPaint Color II ★	1.02	1MB/6.0.3		Free
LetraStudio	1.5	2MB/6.0		$45
LetrTuck+	2.0	512K/3.2		$20
Lightspeed Color Layout System	2.0	1MB/6.0		*
Mac86	2.0	1MB/6.0.2		$10
Mac286	2.0	1MB/6.0.2		*
Mac3270	2.0	1MB/6.0.3		*
MacAnalyst	2.0	2MB/6.0		$125
MacArchitrion	4.0	2MB/6.0.3		Free
MacAtlas Paint	2.0	512K/3.2		$35
MacClassAds	4.0	1MB/6.0		*
MacConcept	3.0	1MB/6.0.3		*
MacDesigner	3.0	2MB/6.0		$125
MacDraft	2.1	1MB/6.0.2	12/90	*
MacDraw II	1.1	1MB/6.0		*
MacEnvelope	5.0	512KE/3.2		$25
MacEnvelope Plus	2.0	512KE/3.2		$50
Macintosh Yellow Pages	1.1	1MB/6.0		*
MacFalcon	2.1	1MB/6.0.3		*



Product	V.	Req.	Rev.	Price
MacFlow ★	3.1.5	1MB/6.0.3		Free
MacFortran	2.4	512K/4.2		*
MacFortran/020	2.4	512K/4.2		*
MacFortran for MPW	1.1	2MB/6.0.2		Free
MacInUse	3.0	1MB/6.0		$30
MacLinkPlus/PC	4.5	1MB/6.0.2		*
MacLinkPlus/Wang VS	4.0	512KE/3.2		$45
MacLotto	2.1	512K/4.0		$10
MacMainFrame 3270/CUT	2.1	2.5MB/6.0.2		$100
MacMoney	3.5	512KE/4.0		$12
MacPhonebook	3.0	1MB/6.0		*
MacProject II	2.1	1MB/6.0		Free
MacProof ★	3.2.1	1MB/6.0.2		$30
MacRascol	2.0	2MB/4.1		$25
MacRecorder	2.0	512K/3.2		*
MacroMind Director	2.0	2MB/6.0.2	10/90	$100
MacSafe II		512KE/4.2	10/90	*
MacSchedule	2.0	1MB/6.0		$30
MacSmarts	4.0	1MB/6.0		*
MacTell	3.5	512K/3.0		*
MacTerminal	3.0	512K/3.2		$65
MacVision Video Digitizer	3.1	1MB/6.0.2		$50
MacWrite II	1.1	1MB/6.0		Free
Managing Your Money	4.0	1MB/6.0.3	6/90	*
MapGrafix	2.0	4MB/6.0.3		Free
Maple	4.2.1	1MB/6.0		*
MarcoPolo	1.1	1MB/6.0		Free
MarketMaster	II+	1MB/6.0.3		$25
MarkUp	1.02	1MB/6.0		Free
Master Tracks Pro 4	4.12	1MB/4.1	6/90	$45
MathCAD ★	2.06	1MB/6.0.2		Free
Mathematica	**2.0**	**1MB/6.0**		*
MathType	2.1	512K/6.0.2		*
Matlab	1.2	1MB/3.0		*
MaxPage ★	1.2	512K/3.2		Free
McClint	2.0	1MB/4.2		$25
McCPrint	2.1	512K/4.2		$25
McMax	2.0	1MB/5.0		*
MGMStation ★	2.5	512KE/3.0		*
MicroPhone II	3.0	512K/4.2	7/90	*
Microsoft Excel	3.0	1MB/6.0.2		*
Microsoft File	2.0	512K/3.2		*
Microsoft Mail	3.0	1MB/6.0.2		*
Microsoft PowerPoint	2.01	1MB/6.0		Free
Microsoft Word	4.0	512KE/3.2		*
Microsoft Works	2.0	512K/6.0		*
MindWrite ★	2.1	512KE/4.2		*
MiniCad Plus	3.0	1MB/6.0		*
MiniDraw	4.0	512KE/4.2		$17
MockPackage Plus Utilities	4.4	512KE/3.2		$15
ModelShop II		1MB/6.0.2		$150
Modern Artist	2.0	2MB/6.0.2		$150
Monte Carlo	2.2	1MB/6.0.3		$60
More ★	3	1MB/4.1	12/90	*
MSFL: Pro League Football	2.0	1MB/6.0		*
Multi-Ad Creator	2.2	2MB/6.0.3		*
MultiClip	2.0	512K/6.0.2	8/90	*
MultiLedger ★	1.1	512K/3.2		Free
MusicProse	2.1	1MB/6.0		Free
Music Publisher	2.5	1MB/6.0		*
MyDiskLabeler III		1MB/6.0		$25
M.Y.O.B.	2.0	1MB/6.0		*
MyTimeManager	2.0	1MB/6.0		*
Navigate	2.0	1MB/6.0		Free
Nemesis Go Master	4.0	512K/4.1		*
NetMinder Ethernet	1.2	2MB/6.0		*
Network Bundle for the Mac	3.0	512K/3.2	7/90	*

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Scott Campbell

Aldus FreeHand gives you the option of drawing in a color Preview mode (left) so you can see what you're doing. You can draw only in a keyline mode (right) with Illustrator.

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PRODUCT UPDATES

Product	V.	Req.	Rev.	Price
Network DiskFit	1.5	512K/4.1		$30
The NightWatch ★	1.03	512KE/3.2		*
Nisus	3.04	1MB/6.0.2	2/91	Free
Now Utilities	2.0	1MB/6.0.2		$25
NuPaint ★	1.04	512K/3.2		Free
NuTools	1.2	1MB/6.0		*
Nutrition Stack	2.0	1MB/6.0.2		$20
OmniPage ★	2.1	1MB/6.0.2		Free
Omnis 3 Plus/Express	2.0	512KE/3.2		*
On Schedule	2.0	1MB/3.0		*
P51 Mustang Flight Simulator	2.80	512K/3.2		$10
PacerLink	5.0	512K/5.0		*
Panorama	1.5	1MB/4.2		$29.95
Paper Keyboard	1.2	2MB/6.0.3		$25
PEGASYS II	3.2	1MB/6.0.3		Free
Performer Sequencer	3.6	1MB/6.0		*
Personal Golf Stats	2.0	512K/3.2		Free
Personal Phone ★	1.1	1MB/6.0		*
Personal Reference Catalog	2.0	1MB/6.0	10/90	$10
Phonenet Liaison	3.0	1MB/4.2		$75
PhotoMac	1.5	2MB/6.0.3		$75
PhotoMacEdit	1.5	2MB/6.0.3		$30
The Phrase Thesaurus	2.0	1MB/6.0		Free
PICT Detective	2.0	512KE/6.0		$20
PixelPaint	2.1	2MB/4.1		*
PixelPaint Pro	2.0	3MB/6.0.3		$125
Plains & Simple ★	1.06	1MB/3.2		*
PostShow	1.1	1MB/6.0		$35
PowerDraw	3.0	1MB/6.0		*
PowerStation ★	2.5.2	512K/4.1		Free
PowerTools	3.0	4MB/6.0		*
Practica Musica	2.1	512K/3.2		$10
Printer Interface III	2.0	512K/6.0.2		$22.50
Pro-Cite ★	1.3	512K/4.1		*
Professional Composer	2.3	1MB/6.0.3		Free
Professional Image II	2.0	1MB/6.0		$22
The Programmer's Online Companion	2.0	1MB/6.0.2		$10
Prograph	2.0	2MB/6.0	8/90	*
Property Management III		1MB/6.0.1		$100
PropsForms	2.0	1MB/6.0.3		Free
Prototyper ★	2.01	1MB/4.1		$79
Publish It	1.2	512KE/5.0		*
Publish It Easy	2.0	1MB/6.0	9/90	*
Publish or Perish	5.0	512K/4.2		$10
Pyro	4.0	512K/4.1	7/90	$15
Q-Sheet A/V	2.0	1MB/6.0	10/90	$50
QuarkXPress	3.0	2MB/6.0.5	11/90	$30
Quicken ★	1.5	512K/3.2		*
QuicKeys²	2.0.1	1MB/6.0.2	1/91	$49.95
QuickLetter	1.1.2	1MB/6.0		$30
QuickLock	2.0	512KE/3.2	10/90	Free
QuickMail	2.2	512KE/3.2		$95
QuickShare	2.0	512KE/3.2		$75
QuickShot ★	2.1	1MB/4.2		$5
RagTime 3	3.04	2MB/6.0	8/90	$150
Read-It OCR Personal	2.1	1MB/6.0.3		$29
Read-It OCR Professional	3.0	2MB/6.0.3		*
ReadySetGo	4.5	1MB/6.0		*
Real Estate Edge	2.0	1MB/6.0.3		Free
Rendezvous	2.5	512KE/4.1		$15
Reports ★	1.2	1MB/6.0		Free
Retail Engine	3.0	1MB/6.0		*
Sales and Market Forecasting Toolkit	2.0	1MB/6.0		$49
Sales Associate	1.10	1MB/6.0.3		Free
SAM	2.0	1MB/6.0	2/91	$29.95
ScanMan Model 32		1MB/6.0	10/90	Free
ScheduleMaker ★	3.01	1MB/6.0		$25
ScreenSnap ★	2.2	1MB/4.2		*
ScriptEdit	2.0	1MB/6.0.4		$25
Sentinel	2.2	1MB/6.0		$30
Shanghai	2.0	1MB/6.0.2		$13
Shortcut	1.5	1MB/6.0		Free
SimMac	3.1	1MB/6.0.2		Free
SimpleSpan	2.5	512K/3.2		*
Smart Alarms & Appointment Diaries	3.1	1MB/6.0.2	12/90	$25
Smart Alarms & Multi-User Appointment Diaries	3.01	1MB/6.0.2	12/90	*
SmartForm Assistant	1.1	1MB/6.0		Free
SmartForm Designer	1.1	1MB/6.0		Free
SmartScrap & The Clipper	2.0	1MB/6.0.3		$20
Snap ★	3.1	1MB/3.0		*
SnapJot	3.0	512K/4.1		*
SoftPC ★	1.3	2MB/6.0		*
Sound Designer Universal ★	1.5	512K/6.0.3		$45
Spelling Coach Professional	3.1	512KE/4.2		*
Spellswell ★	2.2	512K/3.2		$20
Spinnaker Plus	2.0	2MB/6.0		$45
Springboard Publisher	2.0	1MB/6.0		*
Stepping Out II	2.0	1MB/4.1		Free
StickyBusiness	1.06	512KE/6.0.3		Free
StrataVision 3d	2.0	2MB/6.0.3		$99
StuffIt Classic	1.6	1MB/6.0		*
StuffIt Deluxe	2.0	1MB/6.0		Free
Suitcase II	1.2.6	512KE/4.1		$25
Super 3D	2.1	512KE/6.0.2		Free
SuperANOVA	1.1	1MB/6.0.2		Free
SuperGlue II with GlueNotes	2.1	1MB/6.0		*
SuperLaserSpool	2.0.2	1MB/6.0		$30
SuperPaint	2.0	1MB/6.0.2		$50
SuperSpool	5.0	512K/4.1		$30
Sybil	2.0	1MB/6.0	11/90	*
Synchronicity	2.5	512KE/3.2		$10
Systat	5.1	2MB/6.0		*
Teacher's Rollbook ★	2.2	512K/3.2		$17.95
Tempo II	1.02	1MB/4.2		*
Tempo+ Tools ★	1.1	1MB/4.2		*
Ternary Plot	3.0	512K/3.2		*
TextPert ★	3.01	1MB/6.0		Free
TextScan	3.04	1MB/6.0		$69.95
TGRAF-07/Mac	2.0	2MB/6.0		*
Theorist	1.1	1MB/6.0		*
Think C	4.0	1MB/5.0		*
Think Pascal	3.0	1MB/5.0	11/90	$69
ThunderWorks	1.0.3	1MB/6.0.2		$69
Timbuktu	3.1	1MB/4.1	10/90	*
Timbuktu/Remote	2.0	1MB/4.1		*
TimeMinder	2.0	1MB/4.2		$50
Timeslips III	2.0	1MB/6.0.2		*
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Trapeze ★	2.1	1MB/6.0		$35
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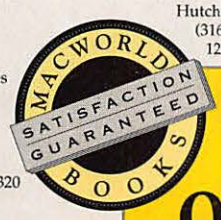
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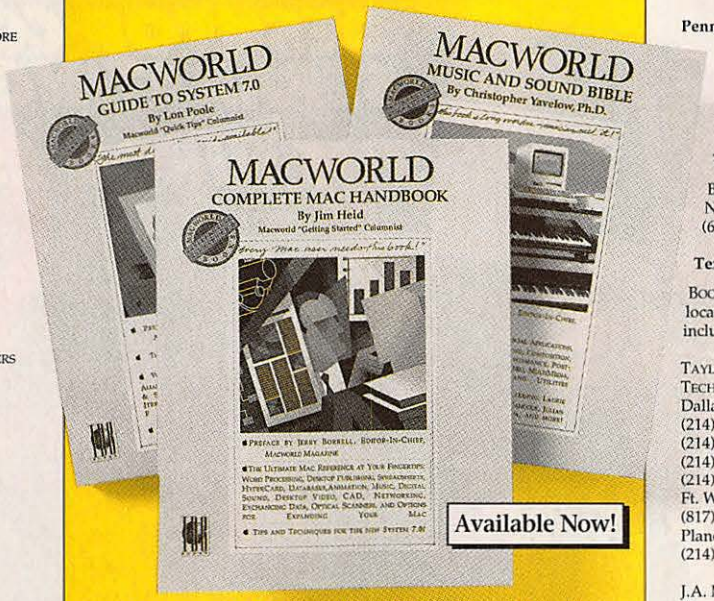
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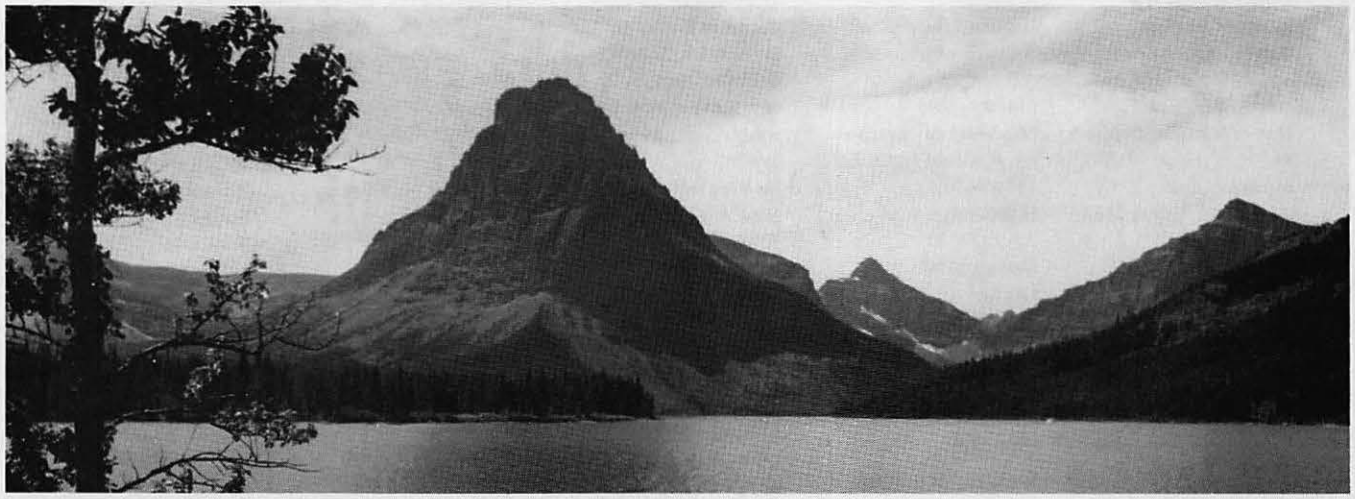
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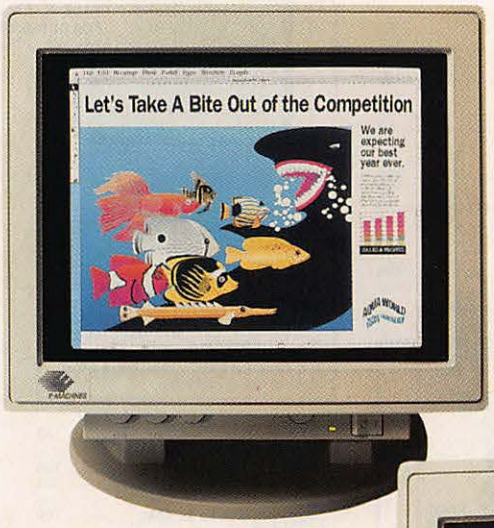
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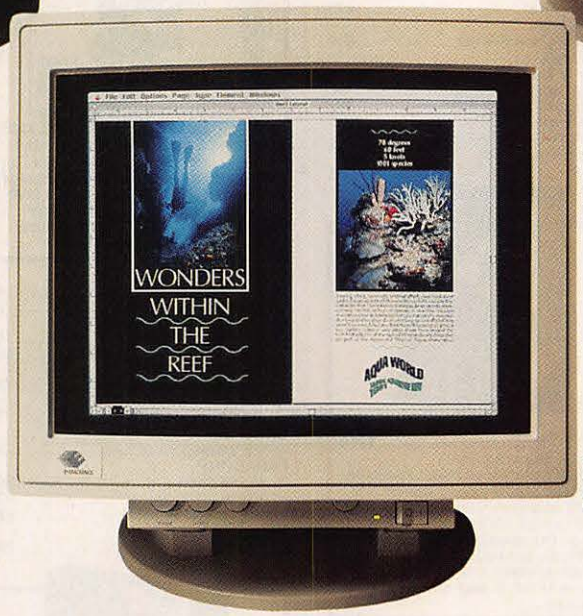
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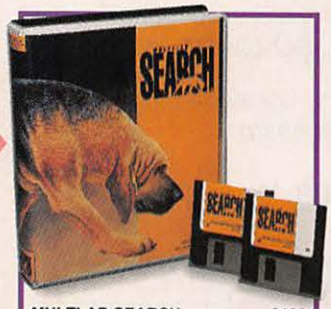
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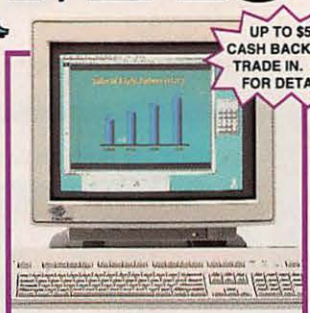
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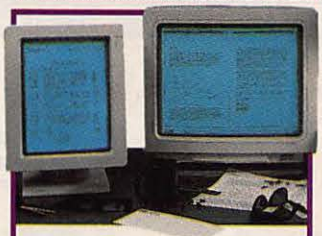
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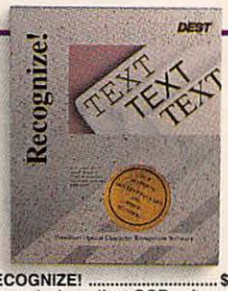
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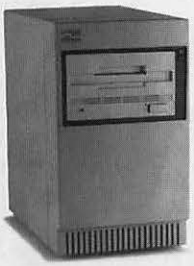
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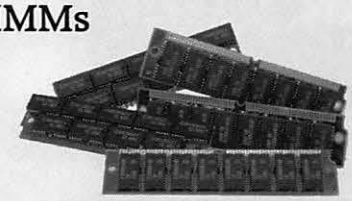
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This equipment is designed for firms engaging in color print reproduction, such as publishing companies, advertising agencies, graphic design studios, service bureaus, in-house graphics departments, video production companies, and CAD studios.

With an uncalibrated monitor, what you see isn't what you get. The calibrator lets you set your monitor so that the color on screen is as close as possible to actual ink and screen combination colors. Conditions vary from time to time, depending on room lighting, monitor settings, etc. This is why you'll need your screen calibrator ready when you start a new job. Works with Apple, Raster Ops and Radius color monitors. ColorPoint printers produce a beautiful glossy color laser print suitable for proofing color work or producing comprehensive layouts. The print quality is better than some other printers costing twice as much. The Nikon Slide scanner produces a clear, professional quality scan suitable for color or black and white printing. Several of the photos in this ad were produced using one.

Seiko ColorPoint PS printer (letter size)	$5949
Seiko ColorPoint PS printer (tabloid size)	8499
Nikon LS 3500 Film Scanner	9365
SuperMatch Color Calibrator	499

Call for prices on Tektronix Phaser PX-2, SX-2 and ColorQuick printers. Also available, HP PaintJet color printers.

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Ikegami Trinitron 19"	2195
Ikegami 8- & 24-bit Systems	Call

Circle 114 on reader service card

Most deliveries via Federal Express.

Third Wave Computing

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(800) 284-0486

Graphic Design ©Three A. D. Inc., 1991. Photography ©Jack Puryear Photography, 1990/91, ©John D. Mitchell of Infocus Photography, 1991. This ad was produced using a Macintosh IIcx and SE30, with Third Wave removable drives, Quantum 105 internal drives, a Nikon LS slide scanner and a Microtek 300ZS color scanner. It was output on a Compugraphic 9600. Software used includes Adobe Illustrator, Photoshop and PageMaker. The product names are trademarks of their respective companies.

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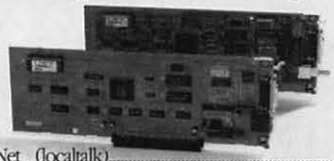
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V.42 bis MNP-5 Modem	$175

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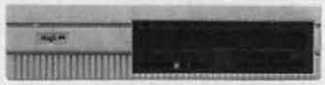


A/UX compatible, includes Disk Manager Mac formatting software, 10Mb free software, surge protection, External SCSI selector, & Two year warranty.

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MagicScan 256 grayscale with Imagestudio software	$1099
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Daystar FastCache IIci	269
Daystar PowerCache IIci 40mhz	969
Daystar SCSI Powercard 0 MB	1133
Magic RailGun 030 Accelerator 16	499
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Astante 10 T Hub	989
Avatar MacMainFrame II Coax Gateway	1789
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Cayman Gator Card Ethernet	449
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Farralon EtherNet Card	419
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Nuvotech Nuvolink II	285
Nuvotech TurboStar	1059
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Oracle Mac DB	411
Racal-Interlan Mac Connect	337
Shiva Ethergate	1725
Shiva Fastpath 4	1999
Sitka Tops Network Bundle IBM	169
Sitka Tops Network Bundle Mac	199
White Pine Exodus X Windows	329

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CD Technology Porta Drive	685
Grolier Electronic Encyclopedia	229
NEC CDR-72 Drive/interface	789
NEC Port CDRom/interface	483
Toshiba CD Rom Drive	759
Wayzata CIA WorldFact Book	95
Whole Earth Catalogue	87
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Digitizers

AudioMedia	729
Calcomp 12x18 Tablet	729
Calcomp WIZ Tablet	139
Farallon MacRecorder	159
Farallon MediaTracks	187
Kurta 8.5x11	333

Emulation/Translation

Insignia Access PC	63
Insignia SoftPC with AT/EGA	339
Orange Micro Mac 386	1745

Mouse/Keyboard

Abaton Pro Point	88
Advanced Gravis MouseStick ADB	60
Appoint Mouse Pro Pen ADB	67
CH RollerMouse	78
Curtis MVP Mouse	88
Datadesk Mac 101 ADB	137
Kensington TurboMouse	110
Keytronic MacPro Plus Keyboard	133
Keytronic TrakPro Keyboard	219
Mouse Systems LittleMouse ADB	76
MicroSpeed Mac Trac ADB	79

Modems/ Telecommunication

Abaton Interfax 24/96	399
AE DataLink External Fax/MNP	249
AE DataLink Internal 2400	199
AE Quadralink	199
Dove DoveFax Desktop	289
Hayes Ultra SmartModem 9600	865
Hayes V Series 9600 V.42BIS x .25	715
Incomm Internal 2400 Modem	99
Magic 2400 with SendFax	98
Orchid Technololgies Fax Modem	439
Practical Peripherals 9600 V.32/V.42	519
Promethius ProModem 2400 Internal	198
Shiva Netmodem V.32	1429
Telebit T1000 9600 Baud	625
US Robotics Courer V.32/9600	675
US Robotics Courer HST 14.4 V.42BIS	679
US Robotics Courier HST IX	999

Display/Video Systems

19 Trinitron Monitor	2399
Amdek PowerPage Card II,SE,SE30"	289
Amdek 14. White Monitor	169
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Calcomp 21 Grey 8 Bit System	2269
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Radius QuickColor Graphics Accelerator	475
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Radius Color Display 19	3349
RasterOps 24L 19 System	5790
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RasterOps 364 Card	915
RasterOps ClearView Classic 19	1579
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Sigma ColorMax 8/24 8 bit 19	4299
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Abaton LaserScript	2489
Adobe PostScript Cartridge	322
Calcomp 1023 Plotter	3899
Calcomp ColorMaster+ PS 6603	call
GCC Printers	call
HP DeskWriter	725
HP LaserJet III	1755
HP PaintWriter	1119
HP PaintWriter XL	2099
Kodak Diconix Color 4	1129
Kodak Diconix M150	485
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NEC Colormate PS	6895
NEC SilentWriter II Model 90	1789
NewGen PS480	5399
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Panasonic KXP4455 LaserPartner	2299
QMS ColorScript 100 8mb Deluxe	7619
QMS PS 410	2149
Seikosha SP2000 Dot Matrix 8Pin	209
TI MicroLaser 17 Postscript	1329
TI MicroLaser 35 Postscript	1659

Scanners

Caere Typist Hand Scanner	489
Cannon IX-30F Scanner w/interface	1079
Magic Scan 256 Grey	1069
Microtek 300Z	1769
Sharp JX-300	2525

Storage Solutions

AE 3.5 1.44K	224
Bernoulli Transportable 44mb	1079
Dayna Dual Drive 1.2Mb/1.44Mb	789
Dayna Single Drive 1.44Mb	610
Fujitsu 800K Floppy	139
Irwin Magnetics 80mb Tape	839
Kennect Drive 2.4	319
Kennect Tech Rapport	191
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PLI Turbo Floppy	275
Rodime R45 Plus Removable	719
Tecmar LaserVault 650 RWO /Interface	4129

Accesories, Disks, Ribbons

150 Meg Backup Tape	35
60 Meg Backup Tape	22
American Power 110SE UPS	215
American Power 370ci UPS	339
HP DeskJet Cartridges	17
ImageWriter Black Ribbons	3
ImageWriter Color Ribbons	3
ImageWriter Multi Color Ribbon	11
Jet Fill Desk Jet Re-Fill	10
Kensington Complete Line	call
MacDisk DS/DD Bulk 50	call
PC Guardian Mac Anti Theft Pack	34
Sony DS/DD Box 10	call
Sony DS/DD Bulk 50	call
Sony DS/HD Box 10	16
Sony DS/HD Bulk	1
Sopris SE Carrying Bag	55
TI MicroLaser Toner Kit	41

Software

Adobe Fonts	call
Adobe PhotoShop	505
Adobe Type Manager	59
Aldus PageMaker 4	499
Claris CAD	559
Disk Doubler	45
DynaPerspective	499
FileMaker Pro	212
Freedom of the Press	259
Freehand	315
Leonard SmartWorks	189
MacProject II	345
MacRenderMan	596
MacroMind Director	437
MicroSoft Complete Line	call
MiniCad +	489
Norton Utilities	79
Persuasion	315
Pixal Paint Pro	389
Quark Express 3.0	517
Retrospect Remote	269
SoftPC EGA/AT Bundle	355
StrataFlight	119
StrataVision 3D	309
Stuffit Deluxe	57
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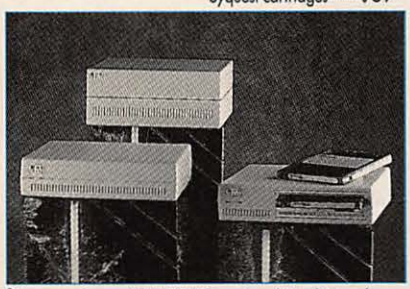
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	105 Mb	12 ms	$479	$559	Slimline
	170 Mb	12 ms	$699	$779	
Imprimis 5.25" Wren Half-Height drives	210 Mb	12 ms	$769	$849	
	425 Mb	12 ms	$1499	$1579	
	425 Mb	15 ms	$1499	$1579	
Imprimis 5.25" Wren Series HD	320 Mb	16 ms	$1119*	$1299*	
	330 Mb	10,7ms	$1449*	$1549*	RUNNER
	640 Mb	16 ms	$1749*	$1849*	
	650 Mb	10,7ms	$2900*	$3000*	RUNNER II
	1,2 Gb	16 ms	$2699*	$2799*	

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Syquest cartridges ••••$69



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	170 Mb	12 ms	$799	$889	
	210 Mb	12 ms	$869	$949	
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	330 Mb	10,7ms	$1599*	$1699	RUNNER
	640 Mb	16 ms	$1999*	$2099	
	1,2 Gb	16 ms	$3199*	$3299	

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When purchasing Systems, compare the options and features. VisionPro Color Graphic cards are manufactured under license for MacTel Technology and support Macintosh graphical needs now and in the future.

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8-Bit Business System,
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8-Bit SystemPro 20",
VisionPro* VideoCard, 20" Trinitron (CT-20)
-75 Hz..... **$ 3249**

8-Bit SystemPro SONY 19 ",
VisionPro* VideoCard, 19" SonyTrinitron (GDM-1950)
-75 Hz..... **$ 3625**

24-Bit VisionPro Interface Upgrade Kit
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All VisionPRO Interface cards have multi-monitor support (Sony 19"& Ikegami 20"), support BlockMode transfer & acceleration,Upgradeable 8-Bit to 24-Bit cards, Pan/Zoom 2X & 4X and virtual desktop. Business system video card offers Pan/Zoom 2X & 4X and virtual desktop.

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Apple 13" RGB..... $749
Seiko14" Trinitron CM 1445
Hi-Res Monitor w/Tilt & Swivel **$589**
Hitachi 14" MVX Super
Hi-Res Monitor w/Tilt & Swivel **$ 575**



Video Interface/cards

8-Bit Vision ST 813
for 13" or 14" Monitor...**$275**
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VisionPro 8 -24 Bit Upgrade Kit..... $700

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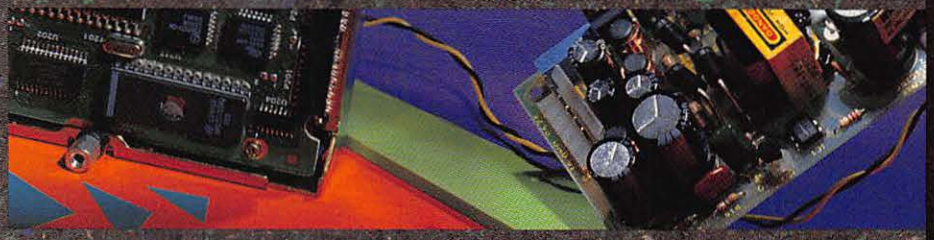
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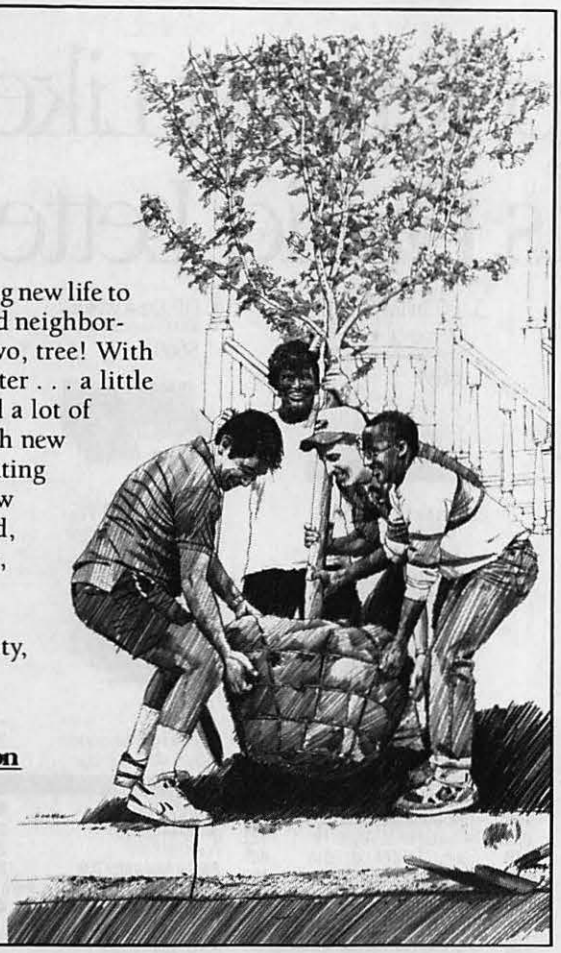
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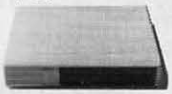
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The Macworld Catalog Advertising Rates & Information

The Macworld Catalog section is a monthly link-up for advertisers and volume purchasers of Macintosh-related products and services. The Catalog offers advertisers a low-cost marketing opportunity and provides readers with a timely, easy-to-use menu for product buying.

Display ads are sold by column inches (2" minimum). Standard red is available as a second color. Text-only listings are available for a minimum of three issues at $520 per issue.

For more information on *The Macworld Catalog*, **call 800/888-8622.**

The Macworld Catalog Advertising Sales Staff

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CD Caddies each	8

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Microsoft Office	549
Xiphias - National Directory	118
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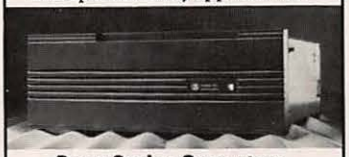
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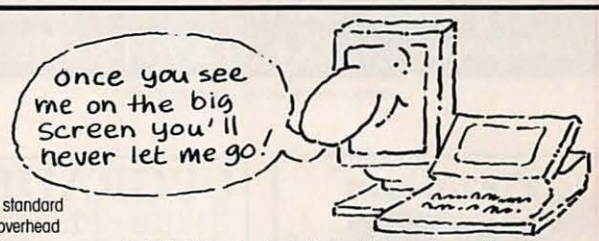
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May 22

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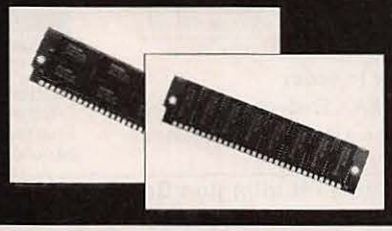
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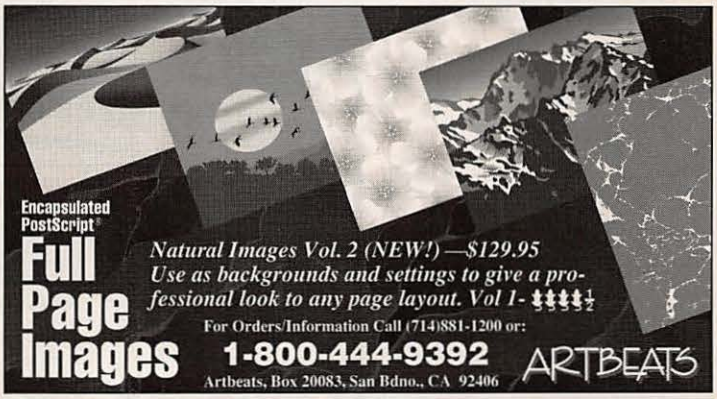
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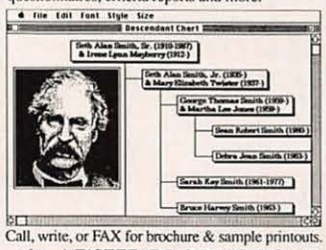
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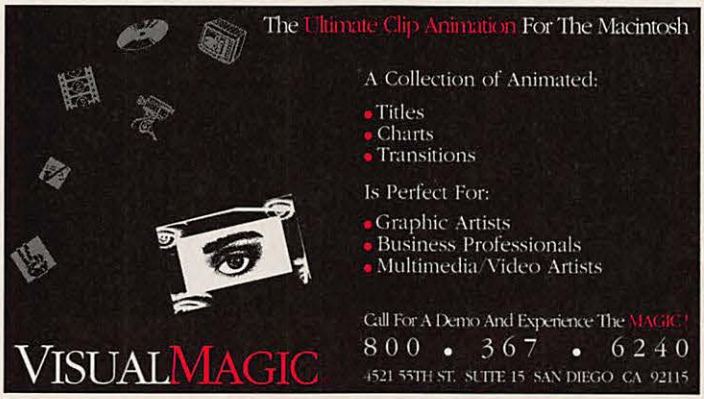
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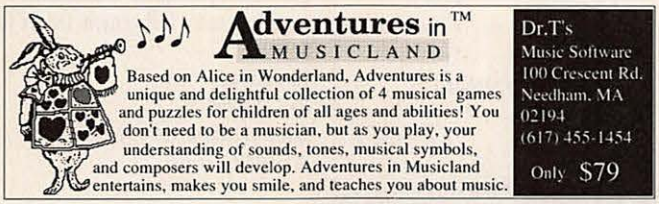
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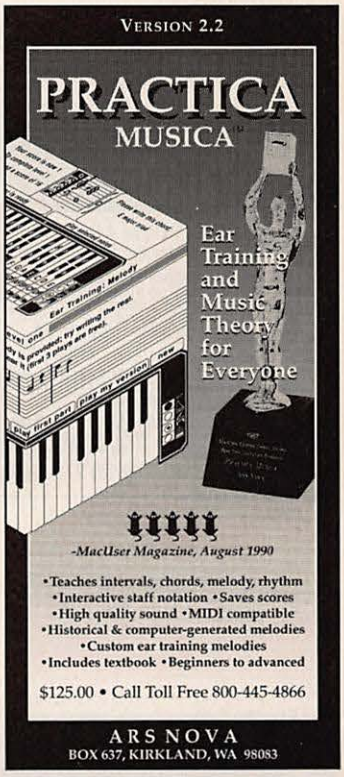
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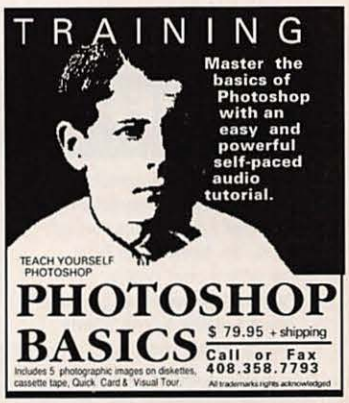
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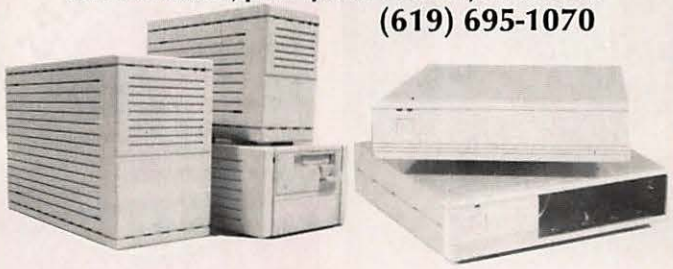
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12 Pads	3.25	3.50	3.75
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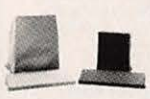
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PRODUCT LAUNCH

SECTION

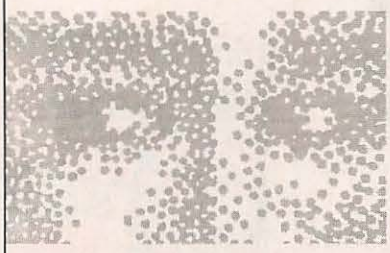
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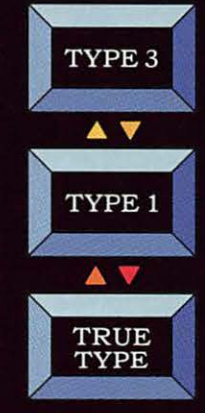
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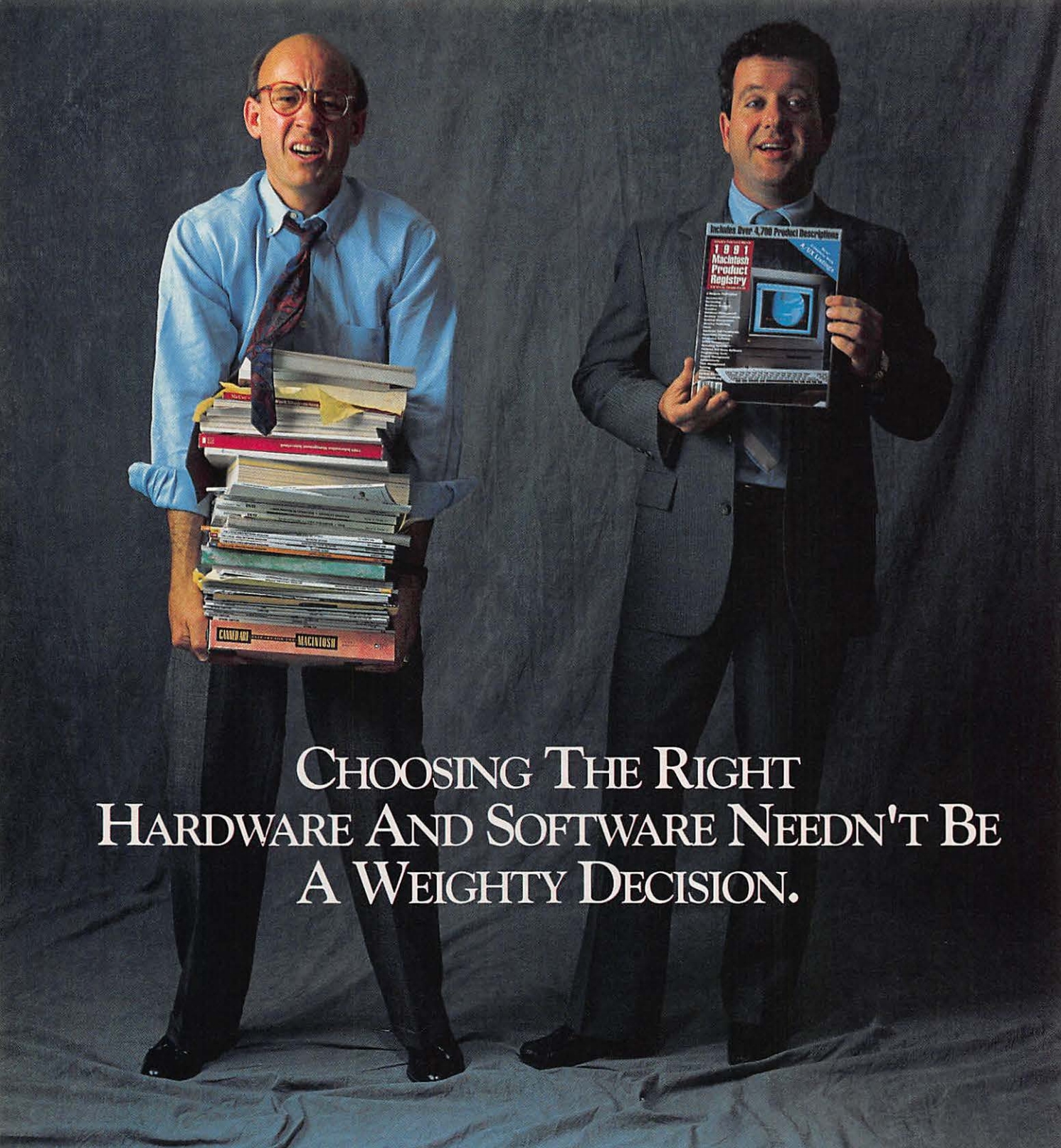


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Text for the menu was created in PageMaker, saved as EPS files and placed in FreeHand.

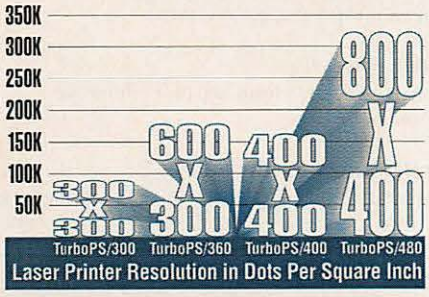
The Images with Impact® clip art illustrations were edited with FreeHand and color was specified in cyan, yellow, magenta and black.

The Apollo logo was created in FreeHand where the various elements were edited and combined.

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The NewGen TurboPS/480 can produce PostScript® language compatible output at 800 x 400 dpi, nearly four times the resolution of other laser printers. And when we say PostScript compatible, we mean it, including Type 1 fonts, special effects and EPS files from all your favorite applications and programs.

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LaserWriter II	NewGen PS/480	Varityper VT-600

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Dealers Circle 244 on Reader Service Card **End Users Circle 246 on Reader Service Card**

BEST-SELLERS

BUSINESS SOFTWARE

Months on chart	Last month	This month		
72	1	1	**Microsoft Word**	Microsoft Corporation
51	3	2	**Microsoft Works**	Microsoft Corporation
63	2	3	**Microsoft Excel**	Microsoft Corporation
59	4	4	**Aldus PageMaker**	Aldus Corporation
24	5	5	**FileMaker II**	Claris Corporation
48	7	6	**MacWrite II**	Claris Corporation
25	6	7	**QuarkXPress**	Quark
11	8	8	**Quicken**	Intuit
19	10	9	**Adobe Illustrator**	Adobe Systems
15	9	10	**Aldus FreeHand**	Aldus Corporation

EDUCATION SOFTWARE

Months on chart	Last month	This month		
26	1	1	**Where in the World Is Carmen Sandiego?**	Brøderbund Software
7	2	2	**Where in Time Is Carmen Sandiego?**	Brøderbund Software
39	4	3	**Reader Rabbit**	The Learning Company
13	3	4	**Where in the USA Is Carmen Sandiego?**	Brøderbund Software
52	5	5	**Math Blaster**	Davidson & Associates

ENTERTAINMENT SOFTWARE

Months on chart	Last month	This month		
17	2	1	**SimCity**	Maxis
15	1	2	**Tetris**	Spectrum HoloByte
2	3	3	**SimEarth**	Maxis
9	4	4	**Welltris**	Spectrum HoloByte
25	5	5	**Falcon**	Spectrum HoloByte

NETWORK/DATA COMMUNICATIONS

Months on chart	Last month	This month		
51	1	1	**TOPS**	Sitka Corporation
46	2	2	**AppleShare**	Apple Computer
10	3	3	**MicroPhone II**	Software Ventures
8	4	4	**Timbuktu**	Farallon Computing
5	5	5	**White Knight**	FreeSoft

MASS STORAGE*

Months on chart	Last month	This month		
15	1	1	**MacStack SD40**	CMS Enhancements
1	—	2	**Micro/Removable MR45**	MicroNet Technology
3	4	3	**UltraDrive 45**	GCC Technologies
2	5	4	**MacStack SD45**	CMS Enhancements
30	2	5	**MacStack SD20**	CMS Enhancements

ADD-IN BOARDS

Months on chart	Last month	This month		
7	3	1	**Pivot**	Radius
6	1	2	**Macintosh Display Card 8•24**	Apple Computer
1	—	3	**Macintosh IIsi NuBus Adapter Card**	Apple Computer
8	2	4	**Radius TPD Interface**	Radius
1	—	5	**Video ColorBoard 364**	RasterOps

UTILITY SOFTWARE

Months on chart	Last month	This month		
13	1	1	**SAM II**	Symantec Corporation
7	3	2	**The Norton Utilities for the Macintosh**	Symantec Corporation
13	2	3	**SUM II**	Symantec Corporation
12	4	4	**Adobe Type Manager**	Adobe Systems
7	—	5	**Virex**	Microcom Software Division

PRODUCT WATCH

Recent or forthcoming products of particular interest.

Picture Press *Storm Technology*
PICT file–compression utility that includes selective compression on foreground areas

Mariah *Symmetry*
Sound and graphics front end for multimedia producers

FrameMaker 3.0 *Frame Technology*
Integrated publishing software that now adds tables and color-separation capabilities

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order vendors. Covers sales during January 1991.

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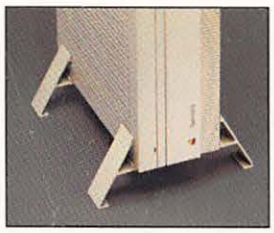
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